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Cases.

CASE OF DIABETES INSIPIDUS.

BY "BOATH."

THE following case occurred in our practice recently:—

A cart gelding, aged eighteen years, had shown signs of diabetes for several days, and had eaten nothing for four days previous to our seeing him.

When first seen he was showing signs of great thirst, but would eat nothing. He passed large quantities of urine every few minutes, which was quite clear in colour, like water. The pulse was 85 and the temperature 102·4 F. The mucous membranes were of a deep yellow colour, indicating liver affection. He was given antacids and offered various foods, but refused them all. A purgative was given the next day and enemas administered, the fæces which were passed being very hard and dry. The purgative acted freely on the following day.

After a week's treatment the diabetes ceased.

We then gave liver stimulants, but he still refused all food. The pulse gradually became quicker and weaker, and death ensued a fortnight after we first saw him, having lived eighteen days without eating food of any kind.

Post-mortem.—The stomach and small intestines contained a large quantity of yellow-coloured fluid, mixed with food.

The large intestines contained soft food, and the floating colon and rectum contained hard, dry fæces.

The liver was very much enlarged, the capsule easily peeled off. The parenchyma of organ was very friable and easily broken down. The kidneys were pale and friable. The lungs had congested areas. The heart was very much enlarged, soft, and degenerated. The point of interest in this case is the large amount of fæces found in the intestines after him living for eighteen days without food.

A SUCCESSFUL CASE OF CALCULUS IN THE URETHRA.

BY MESSRS. J. & A. LAWSON, MANCHESTER.

On August 9th a roan cob of ours was taken ill, showing symptoms of obstruction in the urinary system. Pulse 72, of an irritable character, anxious expression, pawing, sweats, frequent stretching out in the endeavour to urinate, emitting groans during his effort, but no evacuation of urine.

On examination per rectum, the bladder was enormously distended, and we determined to pass the catheter, which, after being inserted, would go no further than ten inches up the urethra on account of an obstruction, which was diagnosed as a calculus.

Being late at night, we made an incision in the perineal region to relieve the bladder and animal, which did so, in that his pulse fell from 72 to 54 in a short space of time. On the following day he was cast, and we cut through the scrotum and wall of urethra on to the calculus, and removed it, afterwards inserting catgut sutures, endeavouring also to keep the catheter *in situ* by tapes, etc., but it was of no avail. For several days afterwards he still urinated through the perineal wound; to prevent this tried shellac varnish and three coats of cotton wool, but they would not remain fixed to the part; we then inserted the catheter every four days until he got so used to the game, he would not allow his penis to be drawn, but both wounds have quite healed and the cob began to work again on September 7th. He began eating and was quite well in himself a day after the removal of the calculus.

On Monday, September 6th, I was present at a P.M. examination made by Mr. Crabb, M.R.C.V.S., New Aberdour, when we found the following interesting pathological conditions.

Subject.—A yearling colt in poor condition.

History.—For some months past the animal had been noticed lame and stiff—first in one limb and then in another; but as it continued to take its food no professional aid was called in, and it was not until Saturday, the 4th, that any other symptoms were shown. On that day it was thought to have a slight attack of colic, and consequently was taken off the grass and housed in the stable. On Sunday linseed oil

was given, but seemed to make the colt very heavy and dull During the night it died.

On *post-mortem* examination the bowels were found perfectly healthy and in moderate condition; the liver seemed enlarged, but there was no doubt when we removed the spleen—it certainly was enlarged. We were not, however, prepared to find the kidneys hypertrophied to such an extent, and our astonishment was greater when we found both about the same size and weight.

The right one measured 16 ins. in circumference, 9 ins. in length, and weighed 7 lbs. 12 ozs. The left was 16½ in circumference, 8¼ ins. in length, and weighed 7 lbs. 5 ozs. The lungs were healthy, but in the heart we found the right, or tricuspid, valves thickened, and in places a calcareous deposit. The left valves were healthy.

Now, the natural deduction drawn from the history and valvular thickenings would be rheumatism, but is it not a fact that in rheumatoid endocarditis the left side and valves are usually affected? But why the enlarged liver, spleen, and extraordinary kidneys?

Perhaps the case is not so uncommon, but I cannot trace the connection between the various conditions, and in the hope of someone being able to give me the pathology I write you the facts.

McLAUCHLAN YOUNG,
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REPORT ON THE WORKING OF THE ARMY VETERINARY DEPARTMENT WITH THE SUAKIN FORCE, 1896.

BY VET.-CAPTAIN HENRY T. W. MANN.

WE subjoin further extracts from this Report as follows:—

Covered Standings for Animals.

The stabling and sheds available were only sufficient to accommodate the chargers, a portion of the battery mules, and allow twenty-two standings to the veterinary hospital. All the remaining animals were in the open; there was no shade of any description.

In letter No. 6, of June 5th, to the general officer commanding, I stated my opinion as to the urgent necessity for some sort of shelter for the cavalry horses, mentioned that all were suffering greatly from the heat, and were much distressed, that there were many cases of fever due to the exposure, and that the sand became so heated as to prevent the horses from lying down at night until it had cooled towards morning.

I suggested that uprights, with cross-stays and a roof of matting, would afford sufficient protection.

Sanction was given for the above; the construction was completed early in July. The accommodation, however, was only sufficient for 60 per cent. of the horses, as the remainder had to stand exposed in the sun, and so the plan was adopted of having the right and left halves of squadrons occupy the shelters on alternate days. The shelters were in use until the end of October, when they were blown down and demolished by a heavy storm.

A shed was built for the slaughter animals.

A very marked improvement was discernible in the appearance of the horses soon after shelter was provided; the number of febrile cases diminished considerably. The above remarks apply also to slaughter animals; prior to being under cover they were great sufferers from the heat.

Dietary.

The importance of the subject of the diets of animals cannot be overestimated. This expedition had peculiarly difficult climatic influences to contend against; and those also of water holding in solution agents repugnant to, and having considerable effect upon, the more important organs of the animal economy. It is on field service that the matter of suitable dieting attains its greatest prominency; circumstances sometimes compel—or the desirability arises for—the substitution wholly, or in part, of other food stuffs instead of ordinary rations. The knowledge as to what may be given with impunity without depreciating the health standard, or of what may, under special conditions, be of benefit, is of moment.

The following varieties of fodder and forage were issued:—Indian hay, Trieste hay, barley, bhoosa, Egyptian tibin, tilli cake, powa, gram, barley, dhoura, and bran. Green grass was obtainable at Tokar towards the end of September; it was issued to the animals there in quarter rations.

Fodder—Hay.

Two kinds of hay were brought from India; the "Bombay" and "Karachi" sorts: both were of good quality. The former consisted of "Khoosii" and "Gondal" grasses, with a small variety of harmless spear-grass. Karachi hay was chiefly "Rosra" grass.

The hay was compressed in bales, varying in weight from 160 to 200 lbs.; most were of the first-mentioned weight; the dimension of these were 4 ft. 4 in. by 1 ft. 8 in. by 1 ft. 5 in. For field service bales of a universal weight of 80 lbs. each are desirable.

The majority of bales were bound with iron bands, the rest with wire.

The cost of this hay, landed in Suakin, was between £10 and £11 per ton.

In July the first consignment of Trieste hay was received through a local agent; it was in wired bales, weighing from 120 to 150 lbs. This hay is grown on the Austrian uplands; it was "well-saved" and of excellent quality. I have rarely seen any in England to equal it; the constituent grasses were of more luxuriant growth and richer in nutritive qualities; they were of the varieties of the greatest value for alimentary purposes—"Italian rye-grass," "cock's foot," "crested dog's-tail," "fox-tail," and clover. The "vernal" grass in it made the hay particularly fragrant.

Between shipment and delivery by the contractor the hay lost 19 per cent. in weight by dryage; after delivery and until issue the loss was 9 per cent.

Delivered at Suakin this hay cost £7 15*s.* per ton. I have gone into details about Trieste hay, as it is of advantage to know where such excellent fodder, at a reasonable price, can be procured.

Bhoosa.

Bhoosa from India was issued in various proportions, the whole time. It was in packages, weighing from 79 to 80 lbs. each; the close compression of the contents and the strong gunny coverings make the packages well calculated to resist the inroads of dew or rain to a great extent.

The bhoosa was from the Rawal Pindi *depôt*, and had been compressed in November-December, 1895, and January, 1896.

In the above form bhoosa is excellent for field service on account of its portability and the resistance it offers to deterioration from exposure to damp, etc. Unless actually submerged for some time in water it is only thin outer layers, and corners of the contents of a package, which suffer from rain, or prolonged exposure to heavy dews. Another advantage is the long period for which it can be kept in store without undergoing any change rendering it unfit for food; it does not readily become musty or unsavory in odour. I have seen many thousands of bales opened; in my opinion, the quality was very fair, and its nutritive value reached a sufficiently high standard; the best proof of the latter part of this statement is the excellent condition the mules maintained throughout the six months. All—with the exception of the ordnance class, which received hay for the first three weeks—were on bhoosa rations from the beginning; the maintenance of their good condition, under the exposure they were suffering, was certainly not entirely due to the grain rations issued to them.

The Soudan horses of various breeds, Syrians, Arabs, Abyssinian, and Dongolese, never have hay, but receive either tibin or barley bhoosa—they look and "do" well on it.

"Tibin," or wheat straw bhoosa, was procured from the Egyptian Commissariat; it was not compressed. Tibin is almost white, and is less coarse in texture than barley bhoosa, nor is it so friable as the latter. It has good nutritive qualities.

Remarks on Hay and Bhoosa.

Full rations of hay were issued for the first three weeks to the cavalry horses and battery ordnance mules; owing to the comparatively small stock in hand and the length of time necessary for consignments to arrive, it then became desirable to reduce the issue. The following scale was introduced:—

Cavalry horses	..	hay, 10 lbs.	mixed bhoosa and tibin,	9 lbs.
„ ponies	..	„ *Nil.*	„ „	13 lbs.
Ordnance mules	..	„ *Nil.*	„ „	16 lbs.
First class „	..	„ *Nil.*	„ „	15 lbs.
Second „ „	..	„ *Nil.*	„ „	13 lbs.
Camels	..	„ *Nil.*	„ „	16 lbs.

Slaughter animals received bhoosa instead of hay. Later on it became necessary to reduce the horses' hay rations to 5 lbs. Shortly before the force left Suakin the stock admitted of 10 lbs. per diem to horses and 5 lbs. to ponies.

In September, on my recommendation, the 200 ponies of the cavalry were put on a five lbs. ration of hay in lieu of the equivalent in bhoosa; having been without shelter the whole time they had suffered considerably in loss of flesh, and the change in diet was made to assist in the recovery of condition.

The whole of the Indian hay was expended by September; Trieste hay was then issued.

Wire and Iron-band Binding of Hay.

For some reasons bands are preferable to wire; there were eight round each bale; these kept the hay more closely compressed, and the bales more

symmetrical in form than wire-bindings can. Bales bound with bands can therefore be more advantageously stowed and stored, at sea and on land, than wire-bound ones.

The disadvantages of wire-binding are, that it admits of the hay bulging outwards at the sides and ends; the bale becoming more bulky and unwieldy.

The wire used on the Indian consignments broke easily, the result being that much hay got loose in transit, and was lost, damaged, or wasted. The wire on the Trieste hay was of better quality, and did not break. After removal from bales, all bands and bindings were stored.

On field service, where there have to be so many make-shifts, wire is of vastly greater utility than iron-bands. The wire best suited for bale-binding and ulterior purposes, is that known as "No. 14 B. W. G." (Birmingham Wire Gauge).

There are few uses to which iron bands can be put which cannot be equally well done by wire; the latter, by its pliable nature, lends itself to purposes for which bands could not be utilised. On service the greatest use of wire is for making "entanglements"; for this it is better adapted than bands are. It also comes in for "bridging," in the erection of "chupper-shelters," for temporary reparative uses, and in numerous other ways. At Suakin wire was particularly useful for picketing horses. Cavalry horses were secured in the following manner:—Owing to the coral-rock being close to the surface the iron picketing pegs could not be driven in; wire, therefore, was looped, "bushed" by being twisted round bits of stick sunk in the sand and bedded with stones. These loops of wire, to which the shackle ropes were fastened, resisted the strain upon them perfectly. The same plan was adopted for tents, where peg-driving was impossible. In the erection of the horse-shelters, the rafters were secured to the bressumers by the iron bands from hay trusses; they were also used in securing the braces.

Green Fodder.

At the end of September there was a sparse growth of grass, at a distance of six miles and upwards in a southerly direction from Suakin. The grass, however, was of such inferior quality, of so coarse a nature (with stiff, hard spinous culms), and so difficult to obtain—owing to scantiness, long distances, and want of water in the desert—that it was impracticable to procure it for the animals. Moreover, I was averse to giving such fodder as the above, as the consumption of it would cause attacks of hæmaturia. The grass grew in tufts among stones in the "khors" (dry water-courses).

Special Remarks on Tokar Grass.

In the course of making enquiries—prior to the coming of the flood-water—as to the grass which grew after it, I was informed by natives that the first crop was poisonous to all animals, and that if fed upon it, they inevitably died from superpurgation and dysentery. That, "the bushes there are poisonous, and as these are burnt down just prior to the arrival of the water, the ashes contain the poisonous principle of the bushes, and this finds its way into the growing grass."

I took steps to verify the statement that fatalities occurred, and found it to be true; a cattle owner at Suakin, of whom I made enquiries, had lost over 100 head, the previous year, of cattle which strayed on the grass at Tokar. The poison theory adopted by the Arabs is incorrect; in my opinion the true solution of the matter is as follows. The Tokar surface soil contains a considerable quantity of salts of potash, soda and magnesia. The water, as it

percolates into the ground, dissolves these salts, and the grass growing immediately after, absorbs the salt solution; the potash, from its caustic nature, is probably the agent which induces the superpurgation and dysentery.

The second crop of grass, which springs up after the second flooding—an event occurring three weeks later than the other—is quite harmless. Reasoning by analogy, this can be explained:—the first flooding has dissolved out all the free salts from the surface soil; none, therefore, are left for solution and subsequent absorption by the grass.

Only "second crop" grass was given to the force animals at Tokar.

Forage.—Bran.

On the arrival at Suakin the quantity of bran in hand was only 70 maunds; as a consignment could not be expected for some time, and none was procurable locally, the issue of bran was limited to sick animals only. That so inadequate a quantity for so large a force had only been brought in the first instance was unfortunate. The animals had to be put upon a hard grain diet, which, in so hot a climate was unsuitable, and resulted in causing a very large number of cases of derangement in the digestive systems.

Bran is an important constituent of diet, and is particularly so for animals which have just done a long sea voyage, as they are then more susceptible than at any other time to the ill-effects of a too stimulating diet. It is desirable this should be recognised, so that a sufficient provision shall be ensured on future occasions. As bran is bulky, in comparison with its weight, it would be a great advantage, on lines of communication, to have it in a compressed form; besides this, the liability to deteriorate would be much diminished if bran were issued in the form of bricks from the base.

In a humid climate, such as that of Suakin, bran will not keep long; it soon becomes moist, sour, and weeviled. These results occur still more rapidly if tarpaulins have to be kept over the sacks much, on account of threatening weather. A free circulation of air in and around the stacks is of importance. The ill-effects of the climate may be postponed by having the contents of the sacks spread in the sun every third week. Recourse was had to this plan at Suakin with good results.

In the commissariat code no provision is made for the supply of bran to animals—except to such as are sick. In letter No. 37 of 15th October, to the principal veterinary officer in India, I invited attention to this matter, and expressed the opinion that an alteration in this respect is required; the reason I adduced was as follows:—"I have no hesitation in stating that, had it not been possible to make arrangements for a bran issue during the past five months, the effect upon the animals would have been a most serious one, followed in all probability by a high rate of mortality. It has only been by paying the strictest attention to dieting that the general health of the animals has been maintained so well as it has been, under exceptionally difficult and trying conditions; my remarks in previous reports on the causation of diseases here will make this patent."

Changes in Diet.

By making a point of being always posted up as to the quantities of supplies in hand at the commissariat stores, and by ascertaining the nature and amount of such as were received from time to time, either from India or through local purchase, I was able to regulate the proportional issues of the various ration items for animals in such a manner that no sudden changes to a wholly-grain ration occurred. The animals were, as much as possible, kept upon a mixed

diet of bran, grain, and barley; the proportion of each being raised or lowered as I found the condition of the animals required or as supplies permitted.

In the matter of fodder, also, it was desirable as much as possible to use the less costly bhoosa and tibin in preference to the more expensive hay; I therefore recommended the issue of as small a proportion of the latter, in conjunction with the bhoosas, as was compatible with the maintenance of the well-being of the animals.

The Work done by the Animals.

Throughout the stay at Suakin there were occasional brigade field-days and frequent route-marches; besides these there were the various regimental parades several days each week; the baggage animals were out on all these occasions with loads on, and covered considerable distances. The mules and ponies were also employed daily in carrying rations and supplies from the commissariat stores, which were situated at some distance, to the various lines. The long distances traversed by the majority of the animals in going to and from water must also be considered under the head of "work."

The Animals of the Force.

The regiment of 1st Bombay Lancers is mounted upon Australian, Arab, Persian, and country-bred horses. The chargers of officers of the force were also of the above castes.

The caste of horses which is most prone to disease, and can withstand the Soudan climate least well, is the Australian. Although there were far more in number of the other breeds, the majority of cases of liver affections and diseases of the digestive system in general occurred in "Walers."

Seasoned Walers—that is, horses not very recently landed in India from Australia, and from eight to ten years of age—stood the Suakin climate better than younger or older horses of that caste.

The ponies were the baggage animals of the Silladar Cavalry; they were all country-breds.

The mules of the various corps and departments were of the ordnance 1st and 2nd classes. Among them were the following breeds: Cape, Persian, Arab, Punjabi, Afghan, country-bred, and Italian.

Only a few camels, belonging to the Silladar Cavalry, were brought.

The bullocks were of the Mysore breed; on the departure of the force they were sold at £4 10s. each to the Egyptian Government.

The cattle, sheep, and goats were each of the kind common in Bombay. As a contract for beef was made locally, there were a few cows for disposal these were eagerly purchased by the Soudanese at from Rs. 30 to Rs. 40 each. The cattle were of the small type, worth about Rs. 10 each in Gujerat. If these are crossed with the Soudan breed a good variety should result.

Goats and sheep were procured locally after the stock from India were exhausted. All were inspected by me prior to purchase.

The Physical Fitness of the Animals for Field Service.

The voyage, with its concomitants of close confinement, heat, and other discomforts, left the horses looking in a poor and "tucked-up" condition when they were debarked.

A considerable number of "Walers" in the regiment formed a portion of a consignment purchased in 1887; many of these are of a make and shape which cannot be got to look to advantage under even favourable circumstances.

The strength in horses debarked was 497: of these, 64 were aged 15 years and upwards, and 64 were just six years older or under. The average age was 10 years; some of the horses were very old, 18, 19, and up to 22 years.

My experiences on this and other expeditions have led me to form the opinion that horses *under* seven years of age, and *over* 14 years, are the ones least capable of resisting climatic influences and the exposure, hardships, etc., which they must suffer on service. For such duty in the field horses under and over the ages specified are, I consider, immature and overmature respectively.

In my opinion it is of even greater importance that horses *under* seven years of age should not be sent on service and that those of over 14 years should be excluded.

The remarks as to the appearance and state of the horses on arrival apply to the ponies also. The strength was 195; of these, 35 were aged 14 and upwards: there were only seven of six years old and under. The "average age" was 10 years two months.

In the ponies also we have the intrinsic condition of over-maturity, tending to disability for field service. I mentioned those of 14 years and upwards for this reason: I consider that 13 years of age should be the limit over which ponies may usually be considered to be unfit for field service. It must be borne in mind that the class of country-bred ponies from which the Silladar ones are obtained is one in which the owners put the animals to work at a very immature age. In consequence of this, their physical powers are exhausted at an earlier period in life than are those of horses.

A point which should have much weight in connection with the advisability of leaving behind both old horses and ponies, is the indubitable fact of the very great difficulty experienced in getting old animals, which have lost condition—an inevitable accompaniment of any expedition on which much hardship is endured—into even a "workable" state again. This leaves aside the consideration, also of moment, that having lost condition they become more susceptible to diseases and ailments.

The mules of the different branches were, taking them all round, good representatives of their various classes. The strength was 468; of these, 30 were 15 years old and upwards, 64 were 6 years old and under. The average age was 9 years 9 months.

The slaughter cattle were in very fair condition on arrival; 786 sheep and goats were very "poor." With regard to the sheep and goats the greater portion was of the female sex; the troops objected on that account to receiving them for rations. Provision is made in paragraph 166, Field Service Departmental Code, Commissariat-Transport, for the prejudice natives have in this respect; the females had to be sold locally or exchanged for males.

Very frequent veterinary inspections were made of the slaughter animals, and it is satisfactory to report that no specific diseases occurred among them.

General health of the animals.

All classes of animals suffered as a result of the circumstances under which they were placed.

The causes which undermined their systems so greatly were:—

(*a*) The intense heat and exposure to the direct rays of the sun; only a small portion of animals were under shelter.

(*b*) The prevalence of extremely hot winds and sandstorms from the desert; these only ceased at the end of September.

(*c*) The difference between day and night temperatures. Although, during the hottest months the fall was not great, the changes occurred suddenly and at uncertain hours towards morning; it was influenced by a breeze from the sea, which was—comparatively—chilly, and had many ill-effects.

(*d*) A too nitrogenous diet, owing to a paucity in the provision of bran at first, a further supply was not obtained from India until the *middle of July*.

(*e*) The brackishness of the water; the effect of this was very severe the first three or four weeks; after that few animals continued to be affected by it.

(*f*) The humidity of the atmosphere; this had a most debilitating effect, for the air was very humid from the middle of June to the end of October.

Although August was the hottest month, the general state of health then was better than it had previously been. There were fewer cases of serious attacks in which the pneumonic, hepatic, and digestive organs were involved. I attributed the decrease of such cases to the fact that the difference between day and night temperatures was *less*, owing to the cessation of breezes from the sea at night; there was, therefore, less liability of contracting chills. On the other hand, the animals had become, speaking generally, in a somewhat less effective "working" condition than they had been; this was due to the exhausting effect and distress caused by the extreme heat. They did not begin to look less emaciated and more "fit" again until towards the end of October.

The climate, surroundings, and circumstances under which the animals existed were so difficult to contend against, to prevent or avert serious consequences, that the utmost vigilance and forethought had to be continually exercised, even in details or occurrences which, in other countries, would be of minor importance, such as a fall of a few degrees in temperature; this, during several months, was invariably followed by high wind and sandstorms. Again, a slight change in the direction of a hot wind had to be provided for at once; cases under treatment had their favourable progress retarded, or jeopardized for days, owing to being exposed during the few minutes which elapsed before their positions could be altered, to a wind coming suddenly from a fresh direction. Although it was so fearfully hot at night it was necessary, to prevent chills, that the animals should have blankets on early. I fixed 8 p.m. as the hour, as, on account of the sudden variation in temperature, it was not possible to clothe them each evening just at the time it became advisable; it was preferable, and less harmful, in spite of the perspiring which the blankets increased, to clothe too early than too late. Chills were frequently responsible for the cases of bilious fever and indigestion.

The climatic influences had less effect upon the mules than upon the horses.

The ponies retained a better standard in health than horses; this, too, in spite of the fact that the former were exposed the whole time, without shelter, in the sun; that their ration scale was less liberal than that of horses; and that they received bhoosa and no hay (with the exception of 5 lbs. each per diem in September). The percentage of sickness among ponies, after eliminating the casualties, such as injuries, was 5·5; among horses it was 10.

With the data afforded by the number and nature of cases treated, it is justifiable to form the conclusion that a comparatively *low* diet is best calculated to render the animal system able to resist the climatic influences, during the hot months, in the Soudan. I refer of course to a force such as the Suakin one, which practically was a stationary one; the forage for the contingent was of too rich a quality prior to the arrival of bran.

I will refer in this portion of the report to the clipping of animals, as it is a valuable measure to take in reference to keeping them in condition, or getting them "fit." Animals, by having their coats off, are saved much

distress from profuse perspiration; they are also less liable to gall; and skin affections—especially in camels—are more readily got under control. All animals of the force were clipped as soon as possible. The mules during the hot months put on very thick coats; in many instances the growth would have been abnormal even for cold weather; this exuberance was doubtlessly due to the humidity of the hot atmosphere.

I had all the slaughter sheep and goats shorn; until this was done they suffered intensely from the heat; afterwards they began to put on flesh. The wool was left on the head and along the ridge of the spine, as a protection from the sun.

Diseases and Ailments of the Animals.—Galls.

The efficiency of a force in the field is, to a great extent, estimated by and depends upon its powers of mobility and locomotion: the capability for unretarded movement is necessarily governed by the "workable" condition of the transport animals and those of the mounted branches. The chief and most numerous factors in producing unfitness for duty are galls.

The *prevention* of the occurrence of these injuries is of vast importance: greater, indeed, than promptness in treatment with a view to speedy restoration to fitness for duty. Galls are not, under some circumstances, entirely preventible; much, however, can be done to lessen the numbers and limit the extent of these injuries by a constant surveillance over the animals and their equipment, so as to ensure requisite precautions being adopted and all due care used.

Among the predisposing causes, which render animals liable to gall, are:—

(*a*) *Soft condition.* This state is met with in the ealiest stage of an expedition, when the muscles have lost "tone" from prolonged inactivity during lengthy railway journeys and sea voyages to the theatre of operations. During these periods, too, the animals' diets have necessarily been of a comparatively laxative nature. I quote an instance in this force, where soft condition was responsible for many galls:—The 26th Punjab Infantry mules, after several days in the train and twelve days at sea, were debarked at Trinkitat, and had to be put into hard work, over heavy sand, the same day, conveying stores a distance of 22 miles to Tokar. This they continued to do until the latter part of the stay of he troops, when the work became lighter. The galls became fewer in number as the animals got into hard condition through good feeding and work.

(*b*) *Impoverished condition.* This becomes patent at a later stage on service, when the debilitating effects of exposure to intense heat show themselves in the loss of flesh; the now-prominent portions of the animal frame gall readily. The emaciation is, of course, greater if the work is exhaustive, or the forage supply meagre or unsuitable. These latter inducives did not obtain with the animals of this contingent.

(*c*) *Exposure to the sun,* in the Soudan, especially in a humid atmosphere, has a very marked effect. The skin becomes tender to an almost inconceivable degree, and so saturated and sodden with perspiration that the least friction or undue pressure produces abrasions or tumefactions. Horses' skins are affected as above to a greater extent than are mules'. At Tokar the horses' skins were affected in a peculiar manner: the hair came out by the roots, leaving bare patches wherever the hand was passed backwards and forwards over the coat. There was no heat or tumefaction, and I am convinced the peculiarity is to be accounted for by the caustic and solvent proper-

ties of the Tokar dust; the perspiration dissolved out the salts from the dust and "local cauterisation" occurred. These stripped patches,—which even the friction of the night-blanket would produce,—were more liable to abrasion than other parts if an exciting cause arose. Such prejudicial influences are beyond our control, and baffle attempts to defeat them.

(*d*) *Being for many hours under loads.* On all occasions when the halts are long enough and circumstances make it practicable, loads should be removed and girths slackened: this relieves the congested state of the skin-vessels and enables them to regain tone; moreover, to omit unloading is exhausting the powers of the animal, with a dead weight on its back, to a needless extent. Tumefactions must occur under long continued pressure without occasional reliefs. Therefore the relieving of loads should be strictly enforced on the march, if the enemy is not in close vicinity and other circumstances admit of the procedure.

It is unnecessary to enumerate all the exciting causes which gave rise to galls; in a country like the Soudan there is, however, one which is responsible for numerous abrasions; it is the presence of sand and dust blown in between the saddlery and skin of the animals. The friction on the moist, matted hair and sand quickly produces troublesome sores.

(*a*) *Tumefactions on ribs.*—These are common in transport mules; they are of importance for two reasons—firstly, besides being extensive and very painful, there are no means which can be employed to take away the load-pressure from the swelling, and thus keep the animal at duty. This is often possible with galls on other parts of the body. Secondly, they frequently take many days to subside. In all the cases I saw the swellings were caused by the pressure of the loads upon the buckles of the girths.

(*b*) *Girth-galls.*—These, too, are common and painful. Much can be done towards preventing them if convoys are halted within an hour after marching off for the purpose of adjusting loads and tightening up girths: the latter have become loose by that time—often so slack that the front edge rubs against the forearm, causing abrasions some inches in length.

(*c*) *Stifle-galls.*—Some are caused by the loads being badly adjusted and coming in contact with the stifle as the hind limb is advanced; others by the breech-chain being too loose and dangling against the front of the thigh; in this case a tumefaction often occurs.

(*d*) *Injuries on flanks* are due to the pressure of loads against the hooks to which the breech-chains fasten. Other abrasions in this region are caused by the corner of the panel being pressed by the load into the flank.

(*e*) *Tumefactions on back.* These are frequently caused in a somewhat curious way, and in which the saddlery, etc., is not in fault, *viz.*, by natives riding animals barebacked to exercise or water. I had to draw attention at Suakin to cases in horses and mules due to the above.

Remarks on Galls.

The few varieties of galls I have mentioned do not nearly exhaust the list of injuries which come in that class; those enumerated, however, are what occur most frequently in transport animals. Very few cases, indeed, of actual "sore-backs" occurred in ordnance or baggage mules.

As demonstrating what a high standard towards perfection in the fitting of saddlery and the adjustment of loads can be attained, I may mention that in

four months only four galls occurred in No. 5 Bombay Mountain Battery, although the mules were out with loads on almost every day, and frequently covered distances up to 15 miles.

I had occasion to enquire into the causes to which a number of galls could be attributed in regimental mules at Tokar. The officer commanding informed me that (*a*) a large proportion of the animals had been used in India for draught and *not* for pack purposes; (*b*) that several men out of his strength of mule-drivers were "entertained" from the docks at Bombay and put on board as drivers. These men knew nothing of animals, and a percentage of the galls could be fairly attributed to their ignorance and incompetency in the duties they were employed for.

Wounds, etc., healed readily until October; the essentials to favourable progression being exclusion of the irritating dust and flies (maggots were produced very rapidly). When a few showers fell and the air became much more humid, the effect of the change in atmospheric conditions upon sores was very marked; the healing process was retarded and a tendency prevailed for wounds to degenerate into indolent ulcers.

Eruptive tegumentary affections also became more prevalent, and showed greater obstinacy in resisting curative measures; the irritation suffered by the subjects was much increased.

In the middle of October an officer's charger developed bursatti; within a week thirty cavalry horses and ponies were under treatment, besides a number of mules. Only one subject (the first case) showed the scar of a previous attack. I was informed that there had been no case in the 1st Bombay Lancers since 1890. Bursatti ulcers had never been seen upon the local animals at Suakin. No cases occurred at Tokar.

In my opinion there is considerable analogy in some respects between this affection and scurvy. At the period of the outbreak the troops were suffering considerably from the last-named disease. In some cases, too, the evidence appeared indisputable that the bursatti organism was frequently conveyed by flies from infected sores to abrasions which were previously free from the taint.

Precautions were taken to exclude affected animals from the vicinity of non-affected ones; it was by this and other means that the malady was prevented from being disseminated to a large number of animals.

Nearly all cases were healed by the middle of November.

The proportion of cases (in horses and ponies) with reference to caste—regard being paid to the respective strengths of each—was as follows:—Two in Australians to three in Arabs to five in country-breds.

With reference to efficacious treatment, I have found in many years' experience that the application of quinine to ulcerated spots which have been thoroughly excised, or scraped, has been followed by most satisfactory results. Healthy action occurs more rapidly than with any other treatment, however varied.

Skin affections.

Comparatively few cases of ordinary skin diseases occurred; there were some of the prurigo or "prickly heat," which is so common in India during the hot weather, but far less than would be seen in a similar strength in animals there. There were no cases of mange in our animals (it existed in camels of the place, but these were excluded), and none contracted the disease, so prevalent in the Soudan, known as "Harâra."

Parasites—External.

Much of the ground about Suakin is infested with ticks; they were always to be found in large numbers upon all the animals. They got on horses and

mules between grooming hours, and in the night, crawling into the angles of the eyes, the nostrils, and other orifices, causing much irritation. The best way to get rid of these pests for the time being was to swim the animals in the sea. A case of prolonged retention of urine occurred owing to the sheath being literally blocked with these parasites, over 250 large ones were removed from it. Some of the Egyptian Government animals were, from loss of blood by ticks, very poor.

Wounds from Thorns.

There were several cases of a troublesome nature of puncturing by thorns. Some of the latter apparently possessed a peculiarly irritant property, as, although the thorns were extracted unbroken, great tumefaction of the punctured limb occurred, accompanied with sympathetic fever.

Bites and Stings.

In September and October many animals were badly bitten by a large fly which appeared in those months; large puffy swellings resulted; when these were on the muzzles, the movements of lips and jaws were interfered with, and the animal could only suck up sloppy mashes. The tumefactions subside, under treatment, in three or four days.

The fly closely resembles the description of one in the Western Soudan, known as the "Seroot" fly, which appears during the rains; the bite is not fatal, but animals lose condition from being unable to feed. The muzzle appears a favourite point of attack—probably because the skin there is easily punctured. The Seroot fly attacks man also, thus differing from the Tsetse fly; men were almost daily treated for bites from the fly which attacked animals at Suakin. The Seroot fly is described as never appearing above Lat. 13° 10′ N., but Suakin is 19° 7′ N.

In the same months many animals—including the slaughter sheep and goats—had "warbles," in which were the larvæ of the œstrus or gad-fly.

Conjunctivitis.

Although the eyes of the animals were protected as much as possible by eye-fringes, the cases of the above nature were very numerous; they were caused by the intense glare and also by the penetration of sand.

Diarrhœa.

Almost every animal for the first few weeks suffered from diarrhœa; in the majority of cases the attacks were not serious; others, however, were sufficiently so to cause great prostration and emaciation. This ailment was caused by the brackish water. Diarrhœa was also induced by chills, and again, by having at one time to feed entirely on a gram diet without admixture of bran.

Colic and its causes.

Tight-girthing.—I noticed that some of the ordnance mules of the Mountain Battery frequently showed colicky symptoms on return from duty; these cases were induced by the compression from the very tight-girthing which is necessary for "top" loads.

(*b*) *Eating Mud.* When rain had fallen, and the ground surface was muddy, a number of horses took to eating it, its saline character probably attracted them. Many cases of indigestion could be rightly ascribed to this habit.

(*c*) *Winds and rain-chills.* When the night-breeze, usually from seaward, was stronger or less hot than usual, cases of colic occurred. All possible precautions were taken to prevent chills by clothing early in the evening. Cases constantly occurred after animals had been exposed to rain.

(*d*) *Impaired action of the liver.* A large number of indigestion cases resulted from the hepatic action being impaired, as the effect of a too nitrogenous diet. There was a marked difference between cases arising from this cause, and those which were induced by chills; the latter were much more acute and violent, with a speedy termination, the former were sub-acute, and obstinate in resisting treatment. The diet was modified as much as circumstances allowed.

Pneumonic Affections.

There were, comparatively, few cases of the above nature; the majority occurred on first arrival in horses and mules which had contracted the diseases on the voyage; some landed in a moribund state.

Laryngitis.

Cases of the above were very prevalent for the first month; some of the coughs did not yield to treatment for several months.

Fevers.

Fevers of "simple" and "bilious" types occurred from the beginning to the end of the stay at Suakin. Very large numbers of animals were under treatment for either one form or the other; many of the cases were of an extremely serious nature. Temperatures ran exceptionally high: many between 106° and 107°; a few over this. No animal died; but the cases were most obstinate and lingering in yielding to treatment, necessitating great carefulness in attention and nursing; it was this indeed which saved the cases without a fatality occurring.

The animals were left in a very enfeebled condition for long periods after these attacks. When milk was procurable it was used for the worst cases. Some of the horses subsisted for days on milk alone: it was the best recuperative agent.

Exposure to the extreme heat was undoubtedly the primary cause responsible in inducing fever; the exposure enfeebled the animals constitutionally; the functions of the hepatic and digestive systems became impaired or were interfered with, and the animals were thus rendered extremely susceptible to chills when a slight change in temperature occurred, the liver being usually the organ which was most affected.

A very general state of hepatic congestion existed among the horses and ponies, as the climatic conditions—heat and humidity—were so conducive to engorgement of the livers. All that was possible, in the giving of the most suitable diet, was done.

Contagious or Infectious Diseases.

With the exception of two cases of adenitis (strangles) in mules, there were no contagious or infectious diseases in animals of the force. Of the two

mules, one was a four-year-old, the other was aged; they had stood next to each other. The cases occurred almost simultaneously; both animals had been segregated several days, before the disease developed, for observation; all necessary precautions were taken, and there was no further spread of the malady.

Sheep and Goats.

Among the slaughter sheep and goats there was much sickness and mortality on first arrival; *post-mortem* examinations were made, but no radical disease could be detected. In my opinion the animals were much overcrowded on the voyage over; on some ships, too, they had been neglected; in these cases they were without attendants and fared badly as regards food. The animals arrived in a languid condition with no appetite. I consider the deaths resulted from sheer physical exhaustion, due to neglect and overcrowding on board, supplemented by the great heat. No more deaths occurred after the sheep were shorn and they had been placed under medicinal treatment.

Editorial.

WE much regret to announce the death of our old and highly-respected friend, Mr. Finlay Dun, F.R.C.V.S., who has for years acted as an examiner of the R.C.V.S., and also for the agricultural diploma of the Highland and Agricultural Society. Many years ago he was the lecturer on Materia Medica at the Clyde Street School, and afterwards he published what is still considered the standard book on veterinary medicines.

He was a man of vast experience, not only being a veterinary surgeon, but a practical farmer and an estate agent. His knowledge, apart from the profession, embraced all that was necessary and up to date appertaining to breeding stock of all descriptions. In fact, there was no detail as regards the draining, liming, building, and other matters which farmers should know, which he did not know.

Through his death we have lost a most able member of our profession, and one whose place will be extremely difficult to refill.

We feel assured that all our brothers in the profession, as well as those outside of it, do tender their deepest sympathy to his relatives.

WE have received from Mr. W. R. Jenkins, New York, a copy of Dr. Liautard's American edition of Professor Cadiot's book entitled "Exercises in Equine Surgery."

The work is very well got up, and has numerous illustrations of the various operations performed by French veterinarians.

There are several described in the work which are almost unknown in Britain.

Some of the operations described are ones which cause intense suffering, and are ones we disapprove of. One thing that strikes a Britisher is that, though the operations in many cases are most painful, yet there is no mention as to the administration of an anæsthetic.

THIS issue of the JOURNAL has been delayed in order to record the proceedings of the Quarterly Meeting of the Royal College of Veterinary Surgeons.

Proceedings of the Royal College of Veterinary Surgeons and Veterinary Medical Societies, etc.

ROYAL COLLEGE OF VETERINARY SURGEONS.

A QUARTERLY MEETING of the Council was held on Friday, October 1st, at Red Lion Square, W.C., at which the following members were present:—Professor Penberthy, president (in the chair), Professor McFadyean, Professor James McCall, Professor Pritchard, Professor Shave, Professor W. O. Williams, Vet.-Colonel Lambert, Messrs. Abson, Barrett, Beddard, Bower, Cope, Dollar, Elphick, Fraser, Hartley, Lawson, Locke, Mason, Mulvey, Simpson, Trigger, Villar, Wartnaby, Wragg, and Mr. Hill (secretary).

The SECRETARY read the notice convening the meeting.

Absentees.

The following gentlemen regretted their inability to attend the meeting:—Professor Dewar, Professor Edgar, and Mr. Carter.

Minutes.

The Minutes of the previous meeting, which in accordance with the by-law had been printed and circulated, were, on the motion of Mr. SIMPSON, seconded by Mr. FRASER, taken as read; and slight verbal alterations having been made, were signed as correct.

Correspondence.

The SECRETARY read a letter from Mr. H. Leeney, addressed to the Council of the College, begging permission to withdraw a promise made to the Registration Committee that he would not advertise, as he declined any longer to be bound by a rule which was not made to apply equally to all, and was disregarded by members of the Council. The irregular methods of procedure by which a councilman and member of the Registration Committee might become a secret informer against a rival, and afterwards sit as judge, juryman and assistant executioner, without cross-examination or removal of the mask of secrecy, was opposed to the first principles of justice as understood in the courts. In the interests of the profession he had made an application to the Privy Council, praying their lordships to consider the methods of procedure, and with a view to prevent the miscarriage of justice.

The PRESIDENT said the solicitor had given his opinion on the matter, to the effect that he did not see how the Council could consent to Mr. Leeney withdrawing his undertaking not to advertise.

Presentations.

The following presentations were announced: To the library, *Veterinary Journal, Veterinarian, Veterinary Record, The Journal of Comparative Pathology and Therapeutics*, Annual Report of the Civil Veterinarian Department, Bengal, for the year 1896-7, Annual Reports, Board of Agriculture, 1896, and the *American Journal of Comparative Medicine and Veterinary Archives.* To the museum: Five specimens of calculus, by Mr. H. J. Surmon.

On the motion of Mr. LOCKE, seconded by Mr. ABSON, a hearty vote of thanks was accorded to the donors.

Finance Committee.

The SECRETARY read the Report of the Finance Committee, which stated that Mr. Trigger had been unanimously elected chairman for the ensuing year. The vouchers of receipts and payments had been examined, and found correct. The committee recommended that the hire of cattle for examinations in London be left in the hands of the president and secretary.

On the motion of Mr. TRIGGER, seconded by Mr. LAWSON, the Report was adopted, and the treasurer was empowered to discharge the present liabilities.

Registration Committee.

Mr. SIMPSON, as Chairman of the Registration Committee, read the Report, and moved its adoption.

The Report stated that Mr. Simpson had been unanimously re-elected chairman for the ensuing year. The solicitor had reported on the cases in hand. In one instance he did not consider there was any case under the Veterinary Surgeons Act but had handed the matter over to the Pharmaceutical Society, who, he understood, would proseute under their Act (the offence being advertising the sale of medicines, the person complained of being neither a veterinary surgeon nor a pharmaceutical chemist. In one case the Committee recommended a prosecution under section 17, provided the solicitor could obtain the necessary evidence. In some cases the Committee had directed further inquiries to be made prior to their next meeting, and cautioning letters to be sent in other cases. In several cases of complaints against members for advertising, undertakings had been received, and in others directions were given for the person complained of to appear at the next meeting. One gentleman had appeared before the Committee on a complaint for advertising on bill heads. After hearing his explanation, and his consenting to sign an undertaking to destroy the paper complained of, the Committee did not recommend any further step. In another case a registered practitioner had put on his cards the letters L.R.C.V.S. His solicitor had appeared, and after hearing him and the college solicitor, the Committee considers the gentleman in question had been guilty of an offence under section 16; but on the solicitor promising that his client should sign an undertaking to destroy all the cards objected to, the Committee did not recommend any further step. A complaint had been made against a certain Professor for covering, but the Committee, having investigated the case, found it absolutely without foundation, and they desired to express their regret to the Professor for being troubled, and directed letters to be written to him and to the complainant. It was suggested that in future, when sending out the notices of cases, the positions of the persons complained of should appear. The Committee considered the correspondence, and instructed letters of acknowledgment to be sent in certain cases.

Mr. FRASER seconded the motion for the adoption of the Report.

Mr. TRIGGER said he thought he was correct in assuming that when a complaint was made against a member of the profession, he had no intimation of it sent to him until the matter had been before the Registration Committee.

Professor PRITCHARD said he must take exception to that. It depended entirely upon whether the party complained against was a member of the Registration Committee, because if he was he would have an intimation, as he received the list.

Mr. TRIGGER said he was quite aware of that, but that did not affect the question. He begged to propose that it be an instruction to the Secretary that in all cases where a member of the Royal College of Veterinary Surgeons was complained of, he should at once have a circular sent to him to the effect that a complaint had been lodged against him which would be investigated by the Registration Committee at their next sitting. If precautionary notices were sent out, he had no doubt that in many cases explanations would be forwarded which would finish the matter right off and save the Registration Committee an immense amount of time.

Mr. ELPHICK seconded the motion, and suggested that the nature of the complaint should be stated.

Mr. TRIGGER said that one reason for his making the proposition was that at the committee meeting on the previous day, one of the most frivolous complaints was considered that ought never to have come before the committee at all. A gentleman's name had been used without his knowledge or consent, and then he was charged with covering. If the person complained of knew that such a charge was going to be brought against him, an explanation would be immediately sent, and the fact would not have to appear that he had been summoned to attend before the Registration Committee.

The PRESIDENT reminded Mr. Trigger that the Council were now considering the Report, and that his motion must be taken separately.

The motion for the adoption of the Report was then put and carried.

Mr. TRIGGER said that he would now move the resolution he had just spoken to, namely, that whenever a complaint was lodged against a member of the Royal College of Veterinary Surgeons, an intimation of the complaint, giving its nature, should be sent to him.

Mr. BEDDARD asked why it should be confined to members of the College, and why it should not include every complaint?

Mr. FRASER moved that the notices should be sent to those whose names appeared on the Register.

Mr. VILLAR seconded the proposition.

Mr. TRIGGER said that with Mr. Elphick's permission he would alter his motion in the way suggested, and that the notices should be sent both to members of the College and registered practitioners.

The motion, on being put, was carried unanimously.

On the motion of Mr. SIMPSON, seconded by Mr. TRIGGER, the seal of the College was affixed to prosecutions recommended in the report of the Registration Committee.

Examination Committee.

Mr. MULVEY, chairman of the committee, read the report of the Examination Committee, and moved that it be adopted.

The report stated that the committee recommended that the examiners in Morbid Anatomy, Class C, four years, be informed that under the bye-laws no alteration could be made in the time allowed for the examination. They also recommended that a complete set of modern parturition instruments be purchased for the Class C (practical), and that a small committee to select them be appointed.

Mr. VILLAR said he had pleasure in seconding the motion.

Mr. WRAGG desired to know the probable cost of the instruments.

Mr. DOLLAR replied that he believed the mover of the resolution suggested that the sum of three guineas would be sufficient to obtain a set of instruments from the makers, and that the balance between the sum of three guneas and £5, which was the amount originally suggested as the extreme limit, might be employed in purchasing further instruments. He thought that the general feeling of the committee was that the sum expended should not exceed £5.

Mr. MULVEY stated that two or three years ago a certain sum was allotted to the Examination Committee for the purpose of purchasing instruments, and only a portion of that had as yet been expended. He did not think it necessary to ask the Council for a further sum than that which had already been placed at the disposal of the committee.

The motion was then agreed to.

Parliamentary and General Purposes Committee.

The SECRETARY read the report, from which it appeared that the progress of the Public Health (Scotland) Bill through the Houses and Committee had been watched. The whole profession had been appealed to, and also all members of Parliament in any way connected with the subject. The result had been that section 43 in the Act (section 40 in the Bill) had been so amended as to give veterinary surgeons, duly authorised for the purpose, equal powers with medical officers or sanitary inspectors. Section 60 of the Act (section 52 of the Bill) limited the power of a medical officer to examine animals in a dairy unless accompanied by an approved veterinary surgeon. In the definition clause in the Act the expressions "veterinary surgeon" and "qualified veterinary surgeon" were stated to mean a member of the Royal College of Veterinary Surgeons. That definition for the first time gave members of the College their due pre-eminence as authorities on veterinary subjects. The Committee recommended that a petition be drawn up by the College, and signatures by owners and householders on the south side be obtained for the purposes of laying down wood paving, and that such petitions be presented to the Board of Works for Holborn.

Mr. SIMPSON moved the reception of the report.

Mr. ABSON seconded the motion.

The PRESIDENT said that since the last meeting of the Council the meaning of what a veterinary inspector or veterinary surgeon was, had been defined. He thought they were extremely fortunate in having it so clearly defined and limited to what they considered the proper person. They had, thereby, gained a precedent which they never before had. The thanks of the College were very largely due to the action of the solicitor, who had shown extreme sagacity in the matter. It was greatly through his efforts that this matter was confined to their profession. He might mention that he had the pleasure of seeing the Bill sail through very late in the morning, and there was practically no opposition at the time to anything that affected them. The sanitary inspectors occupied a great deal of the attention of the House of Commons that night. He wrote to the Lord Advocate congratulating him on the passage of the Bill, and thanked him for the attention he had given to their representations. The following reply had been received from him:—"Dear Sir, I am very much obliged for your kind letter of the 29th, and I am gratified to find that your profession is satisfied. I can assure you that I only wish to do justice between conflicting interests, and I always felt that in the matter of live meat inspection your profession demanded recognition."

The motion for the adoption of the report was agreed to.

Mr. TRIGGER said that before passing from the Parliamentary Committee's

Report, he thought this would be a convenient time to bring forward a matter which was allowed by common consent to remain in abeyance at the last meeting. He, as President, had felt very indebted, not only to the members of the veterinary profession for their loyalty and support in the passage of the Public Health (Scotland) Bill through Parliament, and the efforts they brought to bear upon their representatives, but also to many other gentlemen—members of parliament and others, who assisted them. It was felt that a vote of thanks should be accorded to those gentlemen when the proper time arrived for so doing. That time, he thought, had now come. They had to congratulate themselves upon the passage of the Bill in its entirety, and its favourable attitude towards the veterinary profession. Everyone had worked so ably and well that it would be absolutely invidious to begin mentioning names for fear that any should be left out. He desired to say, through the press, to the profession, how greatly he, as president, during the past year, appreciated the efforts of members of the profession and the trouble they had taken. The profession, generally, too, were indebted to others outside their ranks. He begged to move "That the thanks of the Royal College of Veterinary Surgeons be given to all those gentlemen, members of parliament, members of the profession and others, who assisted us in the passage of the clauses of the Public Health (Scotland) Bill, affecting the members of the profession, and that copies of the resolution be printed and circulated."

Mr. DOLLAR seconded the motion, and it was agreed to.

Steel Memorial Committee.

The SECRETARY read the Report. This recommended that the Council should make the award of the medals and select the names of those who should receive them.

Mr. DOLLAR moved that the Report be received.

Mr. MULVEY seconded.

The PRESIDENT remarked that he must say it was felt by the Committee that that was all they could do. Circumstances occurred at the Committee meeting the previous day which rendered it invidious to interfere with the nominating of any gentleman as the recipient of the medal, and it was thought that the Council had better do it themselves. If they accepted the Report, it was for them to award the medals, of which, he believed, there were two. He might tell them there was one condition which could not be fulfilled, namely, the giving of a gold medal, as the funds were insufficient, and it had been decided that the medals should be of bronze.

Mr. WRAGG moved that the Report be adopted.

Mr. WARTNABY seconded the motion, and it was agreed to.

The PRESIDENT said that, if it was their wish, he thought they might proceed to the appointment of the recipients of the medal.

Professor SHAVE asked if it had been decided whether the medal should be bronze or gold.

The PRESIDENT: Gold.

Mr. DOLLAR said the way having been cleared by the action which had been taken, he proposed as the recipient of the first of the Steel Memorial Medals the name of Professor McFadyean. He felt sure his suggestion would be received with acclamation, not only by the members of the Council, but by the profession throughout the length and breadth of the country. He might say that the feeling of the Steel Memorial Committee the previous day was so unanimous in favour of Professor McFadyean receiving the medal that had it not been for the fact that Professor McFadyean was a member of the committee, and felt himself unable, and did in fact absolutely refuse, to accept the honour, they should then have recommended to the Council,

without any further hesitation, that that gentleman should be the first recipient. He begged to propose that the first medal be presented to Professor McFadyean.

Mr. WRAGG said he had great pleasure in seconding the motion.

Mr. TRIGGER had much pleasure in supporting it. He thought the committee, in deciding not to nominate anybody, had dealt with the matter in a very delicate and proper manner, considering the fact that Professor McFadyean was a member of the committee. The committee had shown considerable tact, and the matter was a very proper one for the decision of the Council. He was perfectly satisfied that not only the Council, but the profession generally, would endorse the decision arrived at that day. He had great pleasure in supporting the nomination.

The motion was then put, and carried amid loud applause.

The PRESIDENT, addressing Professor McFadyean, then said he had much pleasure in informing him that he was the recipient of the first Steel Memorial Medal.

Professor McFADYEAN, in acknowledgment, said he assured them he experienced great difficulty in collecting words to express his feelings on that occasion in which to convey to them his profound sense of the honour that had just been conferred upon him. Mr. Dollar, in the speech much too flattering to him (Dr. McFadyean), with which he moved the resolution, was kind enough to explain the circumstances connected with the meeting of the committee the previous night. He certainly thought that, being a member of that committee, he ought not to allow any name to be submitted for that honour. Coming, however, from the hands of the Council with unanimity it was, of course, a different matter. He was not going to say that he thought he had not done anything to advance the good of the profession, but he would say that he never was more disposed than now to take an exceedingly humble view of what he had done. He trusted that the Council would not measure his gratitude by the words he could command at the present moment. He was exceedingly grateful, and no less proud.

The PRESIDENT said it had been also decided that two bronze medals should be given this year.

Mr. SIMPSON said he had much pleasure in proposing that the other medal, of equal value with that which had been awarded to Professor McFadyean, be presented to Vet.-Major Smith for the services he had rendered to the veterinary profession.

Mr. MULVEY had great pleasure in seconding the motion, which was then put and carried amid applause.

Sub-Committee of the Finance Committee.

The PRESIDENT said they would remember that a small sub-committee of the Finance Committee was nominated to inquire into and define the duties of the secretary. He had to report that the Committee met the previous afternoon, and as a result of their deliberations it was considered that the solicitor should no longer undertake secretarial work, and that he only act on the instructions of the President. In that manner a considerable sum of money would be saved annually.

Mr. WRAGG moved that the Report be adopted.

Mr. LAWSON seconded, and the motion was agreed to.

Court of Examiners.

The SECRETARY read the Report of the Court of Examiners. This showed that the written examination was held in London on the 8th, and the orals and practicals on and between the 13th and 17th July.

We have already published the results of these examinations.

The following Report was received from Lieut.-Col. W. B. Walters :—

I have the honour to submit my Report upon the Class A examinations held in London during the present month. Forty-four students were examined with the following result : Passed, 31 ; rejected, 13. First-class honours, 1 ; second, 4. The examiners consider this result to be highly satisfactory from a technical point of view, and also desire to record their appreciation of the improved educational attainments of the candidates, as evinced by the marked superiority of the written papers as compared with former examinations.

Dr. FLEMING, Chairman of Class B Examining Board, reported as follows :—

I have the honour to report, for the information of the Council, R.C.V.S., that at the examination of Class B students, held at the Royal Veterinary College, Camden Town, London, on the 13th and 14th inst., 30 students presented themselves. Of these, 3 were three years' students, of whom 2 passed, 27 were four years' students, of whom 22 passed, 10 of them with 2nd class honours.

Mr. J. ROALFE COX, the Chairman of Class C Examining Board, reported as follows :—

The Board of Examiners, acting in Class C (final oral), 3 years' system, beg to inform the President and Council of the Royal College of Veterinary Surgeons, that they have conducted the examination for London, held on the 13th day of July, at 10, Red Lion Square, with the following result :—9 candidates, 5 passed, 4 rejected. The arrangement for carrying out the examination was convenient and satisfactory to the examiners.

The Board of Examiners, acting in Class C, 4 years' system, beg to inform the President and Council of the Royal College of Veterinary Surgeons, that they have conducted the examination for London, held on the 14th and 15th July at the Veterinary College, Camden Town, with the following result :—29 candidates, 22 passed, 7 rejected. The examiners desire to acknowledge their appreciation of the accommodation and hospitality afforded, and which greatly promoted their convenience in carrying out their duties.

The following report was received from Mr. HARRY OLVER :—

I have nothing to report in reference to the C practical examination recently held in London. The average of the students we considered was not so high so usual. Every facility was given us at the Royal Veterinary College, and the subjects for examination were satisfactory. We still felt the want of a set of parturition instruments.

Professor DUGUID'S Report on the Class D Examination was as follows :—

In preparing a report of the result of the recent examination held at the Royal Veterinary College, Class D (four years' course), the first final held in London under the lengthened period of study, the examiners have much pleasure in informing the Council that they found a marked improvement in the general proficiency of the candidates as compared with those presenting themselves under the three years' course for the final. This is borne out by the fact that, out of 20 candidates, only 3 were rejected, a smaller per centage of rejections than has ever been the case at the final under the old three years' course, notwithstanding the more searching examination now imposed. With regard to the written part of the examination, the examiners on the principles and practice of surgery could not judge of the improvement in this part of the examination, as when acting as practical examiner in the former Class C final they had no written ; but my colleague and I found a great improvement. The answers were, on the whole, much better: they were more precise and more clearly expressed. During the progress of the examination, some remarks were made as to students being kept more than one hour by the examiners on surgery, and they wish it made known to the Council that in London as in Scotland each student was called upon to examine a horse and write a certificate about the same, besides performing some operation, such as firing, &c., outside the time given for the oral examination, viz., one hour ; and they consider this absolutely necessary in the interests alike of the students and the profession. As a proof of this they found the average time taken by the students to examine a horse, and write a certificate, was 38 minutes ; add to this 15 minutes for the operation, and it will be seen that 53 out of the 60 minutes are gone before even a question was asked or a beast, sheep, or dog seen. They consider it would be quite unfair (and I agree with them) to insist on a student examining a horse in a limited space of time, as this final examination is to him such a critical period in his career. In acting as above stated, they are following the lines of the C practical examination, two students being examined within two hours. The examiners in surgery consider that a set of parturition instruments would materially assist them in their work, and in like manner the

examiners in medicine think that some of the aids to diagnosis, such as a stethoscope and phonendoscope, would be useful to them. With regard to meat inspection, my colleague and I feel that to make this part of the examination a uniform and practical one, difficulties exist in London that need not be experienced in Scotland. In both Edinburgh and Glasgow there are public abattoirs to which we were admitted, and several of the carcases condemned as unfit for human food placed at our disposal for examination purposes. In London there is no public abattoir ; the whole of the slaughter-houses are occupied either by the owners of the property or by tenants paying yearly rentals, and therefore it may be said that there is no systematic inspection of meat in London ; and on this account any material for a practical examination in meat inspection will be very difficult to obtain.

The SECRETARY also read a letter from Mr. Villar, one of the delegates appointed by the President to attend the examinations :—

I beg to report that according to the wish of the President, as expressed in your letter of June 16th, I attended as delegate of the Council at the July examinations at Red Lion Square and the Royal Veterinary College. So far as I could see the examinations passed off most satisfactorily, but I would draw attention to the fact that the oral in Class D, veterinary surgery and obstetrics, in the case of many candidates exceeded the hour as prescribed by bye-law 72. I had a conversation with the examiners as to this, and was informed that the same excess of time had occurred in Scotland, and that it was absolutely necessary. I therefore offered no objection to the course being continued.

Mr. MASON said he begged to move that the reports be sent to the Examination Committee as usual.

Mr. WARTNABY seconded the motion, which was agreed to.

Dates of Professional and Fellowship Examinations.

On the motion of Professor MCFADYEAN, seconded by Mr. TRIGGER, it was resolved :—

That the Written Examination be held on Friday, the 10th, and that the Oral Examination begin in London on Monday, 13th December.

The PRESIDENT said he did not think it would be possible to fix the exact date of the Oral Examination in Scotland.

Mr. DOLLAR said that he would propose that the examination in Scotland follow on those of London without fixing the date.

Mr. ABSON seconded the motion, which was agreed to.

On the motion of Mr. TRIGGER, seconded by Mr. LOCKE, it was decided that the Fellowship Examination should be held in London on Saturday, 11th December.

Mr. SIMPSON said that before passing from the subject of examinations, he should like to be allowed to propose a vote of thanks to the Principal and Professors of the Royal Veterinary College at Camden Town for the assistance which they had rendered at the last examinations. Only those who had attended the examinations could have any idea of the amount of inconvenience that that College must be put to while the examinations were being conducted.

Mr. MULVEY seconded the motion, which was carried by acclamation.

Professor MCFADYEAN, replying on behalf of the staff of the Royal Veterinary College, said they regarded it among the pleasures of life to meet the examiners of the Royal College Veterinary Surgeons periodically, and that they would only be too happy at all times to do everything in their power to contribute to the smooth working of the examinations, and to make them searching and efficient.

The PRESIDENT said he could not allow this subject to drop without saying how extremely indebted the Council was to the gentlemen who carried out the duties of delegates to the examinations. For the first time in his experience he had had the opportunity of being at the written examination, and he assured the members of the Council that the duty of delegate on that occasion was by no means a sinecure. The utmost care had to be exercised on such occasions, the deputies having a most important function to fulfil.

Personally, he was extremely indebted to Mr. Simpson and Mr. Mulvey, who were delegated by the ex-President to assist at the Written Examination, and also to Mr. Villar, who officiated at the Oral Examination at the Royal Veterinary College.

Election of Auditors.

On the motion of Mr. WRAGG, seconded by Mr. BARRETT, Mr. Wooger and Mr. Warner were elected auditors for the ensuing year.

Election of Scottish Secretary.

On the motion of Professor W. O. WILLIAMS, seconded by Mr. WRAGG, Mr. Rutherford was unanimously re-elected Secretary to the Scottish Section of the Board of Examiners.

Motion by Professor McFadyean.

Professor MCFADYEAN said that a short time ago, on the motion of Mr. Dollar, the Council had made a considerable addition to the list of its Honorary Foreign Associates. He did not suggest for one moment that any name was included that was not worthy of the honour, but he thought it was somewhat of the nature of an omission not to include the name of Professor Johne, of Dresden, who was certainly one of the most distinguished living veterinary pathologists. He had been for a long time a teacher in a Dresden veterinary college, and was co-editor of a standard German text-book of pathology, human and veterinary. He begged to move :—

> That the name of Professor Johne, of the Veterinary High School, Dresden, be added to the list of Honorary Foreign Associates.

Mr. DOLLAR seconded the motion, which was agreed to.

Motion by Mr. Dollar.

Mr. DOLLAR gave notice of his intention to move, in due course, the following alteration to bye-law 8 :—

> Prior to the general business of any general meeting of council being entered upon, the minutes of the preceding general meeting shall be read, or, if a majority of at least three quarters of the members present shall think fit, shall be taken as read. At each special meeting of Council the minutes of the preceding special meeting shall be read, or on the foregoing conditions shall be taken as read.

Obituary.

The SECRETARY read the obituary list.

Professor MCFADYEAN said he rose to discharge the melancholy duty of moving that a vote of condolence be sent to the family of the late Mr. Finlay Dun. That gentleman was known personally to many members on the Council, and he must have been known by reputation to them all. Mr. Finlay Dun was a man of the most sterling and upright character, possessing qualities that would have been eminent in any walk of life. He had contributed in no slight degree to the advancement of the veterinary profession; he was the author of a standard text book on materia medica, and a member of the Examining Board. His removal by death was a great loss to the profession generally.

Vet.-Colonel LAMBERT seconded the motion, which was agreed to.

Notice of Motion by Mr. Villar.

Mr. VILLAR handed in the following notice of motion to amend bye-law 72 :—"To substitute in Examination D, paragraph 2, for 'one hour,' the words 'not less than 60 or more than 90 minutes.'"

Motion by Mr. Barrett.

Mr. BARRETT gave notice of his intention to move the following motion in due course :—

That the Council may relieve a student, or intended student, of one or more of the subjects of the professional examination, provided the Council is satisfied that such student, or intended student, has received an adequate training and passed a sufficient examination in the subject or subjects in respect of which relief is sought.

Special Meeting.

At the conclusion of the foregoing meeting a special meeting was held, Professor Penberthy, President, in the chair, for the purpose of considering certain alterations of bye-laws of which notices of motion had been given by Mr. Mulvey and Mr. Wragg.

On the motion of Mr. MASON, seconded by Mr. WRAGG, the minutes of the previous special meeting were taken as read and confirmed.

The following notice of motion stood in Mr. Mulvey's name :—

To amend bye-law 67 by inserting the words "for one session" between the end of line 4 and the beginning of line 5 of the bye-laws as presented in the register."

As an error had crept into the wording of the motion, Mr. Mulvey asked to be allowed to withdraw it and substitute another.—Agreed to.

Motion by Mr. Wragg.

Mr. WRAGG gave notice of his intention to move an alteration of bye-law 16 so that it read as follows :—

The Council shall prepare an abstract of their proceedings up to the 30th day of April in each year, together with a statement of the funds and property of the College, which shall be read at the annual general meeting, and printed and supplied gratis to members of the body corporate.

On the motion of Mr. TRIGGER, seconded by Mr. DOLLAR, a hearty vote of thanks was accorded to Professor Penberthy for presiding.

MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

THE quarterly meeting was held at the Grand Hotel, Birmingham, on the afternoon of Friday, August 27th. Mr. W. S. Carless, Worcester, presided.

The Loan of the Instruments.

The minutes of the previous meeting were read, confirmed, and arising out of them Mr. TRIGGER asked a question relative to the resolution passed at that meeting forbidding members retaining any of the association's instruments longer than fourteen days. He wanted to know how they proposed to enforce the new rule, seeing that it contained no penal clause.

The HON. SECRETARY said that a member who was present at the Worcester meeting when the resolution in question was passed, had since had one of the instruments in his possession two months.

Mr. WARTNABY said he was strongly in favour of a small fine being imposed. He moved that each member keeping instruments longer than fourteen days be fined 2s. 6d. for each week beyond that period.

Mr. PEMBERTON seconded.

Mr. BURCHNALL said that any member failing to pay the fine should not be allowed the use of the instruments again until he had done so.

After some further discussion the motion was carried unanimously.

A New Member.

The name of Mr. Franklin, Worcester, who was duly nominated at the previous meeting, was submitted for election and was heartily accepted, on the motion of the PRESIDENT, seconded by the HON. SECRETARY.

The Proposed Diamond Jubilee Memorial.

The HON. SECRETARY read the circular letter issued by the Central Association, proposing to establish a Veterinary Surgeon's Benevolent Fund, as a means of commemorating the Diamond Jubilee.

Professor PENBERTHY, who was asked to speak because of his name appearing on the circular as a member of the Central Committee, said he was not in a position to give them any official information on the subject.

Mr. OLVER said the proposal was fresh to the majority of them, but it had the elements of good in it, and certainly could do no harm. There were very few of them who had not from time to time come across members of the profession in necessitous circumstances, not necessarily through their own improvidence, but through sheer misfortune. If appeared to him that if such a fund as the one proposed could be established, it would be a most desirable Jubilee memorial. He failed to see how it would in any way affect what was known as the Manchester Society, and to bring the discussion into order, he would move that this Association co-operate with the Central Association in forwarding the project in question.

The HON. SEC. said he had much pleasure in seconding the motion. He received the Central Association's circular a week or so after the last meeting, which was in May, and that had occasioned considerable delay. Still, he did think he would have been justified in summoning a special meeting simply to consider that one matter.

Mr. TRIGGER said that anxious as he was to advance the unity of the profession, so long as they had in existence a benevolent society which a man, by being reasonably provident, could join, he did not think they would be making the best use of their funds by acting up to this new proposal. When it was remembered how small a sum was raised when they wished to celebrate their own jubilee as a profession, he could not see how this new fund was going to reach large proportions.

Mr. WARTNABY said he had no wish to throw cold water on Mr. Olver's proposition, but he would like to suggest the desirability of allowing the matter to stand over until the next meeting.

The HON. SECRETARY thought a wrong view was being taken of Mr. Olver's proposition. It committed them to nothing seeing what could be done in the matter.

Mr. OLVER said it was his impression that the Manchester Society did nothing for anyone who were not members. The additional fund which it was proposed to establish would not be likely to reach the thousands, and therefore would affect the Manchester Society practically nothing, but nevertheless it might afford temporary and much needed relief in many cases of distress.

The resolution was then put to meeting and lost.

Mr. BLAKEWAY then moved the consideration of the letter be deferred until the next meeting. He said that to a great extent his sympathy was with the matter, but at the same time they had the Manchester Society to consider.

Professor PENBERTHY pointed out that the committee suggested by the Central Committee would be representative of all the societies. It was not a matter for any one society, but for the whole profession.

The PRESIDENT did not think they were pledging themselves to anything by agreeing to co-operate with the Central. Their work would be work of inquiry.

Mr. WARTNABY begged to second Mr. Blakeway's motion.

Mr. MALCOLM could scarcely think the members of the Central would associate themselves with any movement that had no good in it. At the

same time, as the matter had been somewhat sprung upon the members of the Midland Association, he thought there could be no harm done by adjourning the discussion until the next meeting.

Mr. Blakeway's motion was then put to the vote and carried.

Professor STOCKMAN then read an interesting paper on "Some Investigations into Black Quarter and the Efficacy of Setoning."

Derby was chosen as the town in which to hold the next meeting, and before separating the members, as usual, had tea together.

H. J. DAWES, *Hon. Sec.*

LINCOLNSHIRE VETERINARY MEDICAL ASSOCIATION.

A MEETING was held at the Albion Hotel, Lincoln, on Thursday, September 16th, when the president, F. W. Wragg, Esq., F.R.C.V.S., London, occupied the chair. There were also present: Captain Russell, Grantham: Messrs. F. H. Reeks, Spalding; T. Smith, Market Rasen; R. W. Clarke, Horncastle; W. G. B. Dickinson, Boston; H. Howse, Lincoln; J. W. Gresswell, Peterboro'; C. E. Norgate, Retford; C. Hartley, Lincoln; E. C. Russell (hon. sec.), Grantham, members; W. E. Russell, A.V.D., and A. W. Mason, Leeds, visitors.

The minutes were taken as read and confirmed.

The HON. SECRETARY announced the receipt of letters of apology for non-attendance from Professors Penberthy and Williams, Messrs. Weston, Gooch, Mackinder, Freer, Rudkin, Kidd, Allott, Eve, Hunting, J. Smith, Turner, and Hardy.

Messrs. F. Forshaw (Spalding) and H. C. Reeks (Spalding) were elected new members of the association.

The CHAIRMAN observed that they were very pleased to have new members, because it looked as if the association were flourishing.

The Proposed Benevolent Society.

The discussion on the proposed Victoria Veterinary Benevolent Society was then resumed.

The CHAIRMAN said the matter was partially discussed at the last meeting, and he did not think it would be amiss to have the Secretary read that part of the minutes. The reference in the minute-book to this matter was accordingly read.

Captain RUSSELL said he believed he proposed that this matter should be held over to this meeting, and therefore it was, perhaps, his place to open any discussion upon it. He had made it his business during the past month to obtain from Manchester letters referring to the National Manchester Society, and also from London, through Mr. Mahon, the ideas of the Victoria Veterinary Benevolent Society. He might premise by saying that the Manchester was, and always had been, a national society, and that various new rules had been brought in, and were proposed to be brought in, which would carry out the exact ideas which were suggested by the Central Society. Therefore, perhaps it would be better if arrangements could be made to provide for the strengthening of the present society, and make it probably more of a national society, than that they should have a society formed, and oppose it in any way or shape whatever. Mr. Locke, who was secretary of what was called the Manchester Society, but really was the National Benevolent and Mutual Defence Society, assured him that they had relieved many widows and children of members who were not subscribers, and if they were prepared to continue to do the same thing, it must stand to common sense, if they could get together and arrange matters in an amicable manner, I take it that they would require a *quid pro quo*, because they appeared to have considerable funds in hand. (Letters read.)

Considering these two schemes, would it not be better, if there was anything at all in Professor Macqueen's scheme, to amalgamate local societies with the National Society, would it not be possible to embrace them all in the one scheme? Some arrangement, of course, would have to be come to, which could be discussed hereafter as regarded taking over the funds of the National Society at Manchester. They certainly required two hands in the pudding instead of one, but he was fully convinced himself that it was hardly necessary to form another society when they had already one in existence.

Mr. HOWSE: I don't think there is any benefit at all in having another society.

Mr. MASON said that, he being a member of the Council of the National Mutual Defence Society, perhaps a few remarks from him would not at that moment be inadvisable. He thought seriously that that society and other societies should take notice of the idea that the Council wished to carry at the next annual meeting of the National Society. They had, as they had heard in Mr. Locke's letter, relieved cases of wives or families, or even relations of veterinary surgeons who had not been members of the Association. Mr. Mason said it was thought advisable, through certain agitations that had taken place in the last few years, if they did not perhaps carry their benefits further, they ought to have a rule to enable them to make use of their funds to assist the relatives of members of the profession, whether they were members or not of the Association. There was no doubt that would be carried. They might remember that some few years ago there was an agitation similar to this in Yorkshire. In Yorkshire they thought they would like to have a benevolent society of their own, and they agitated on the same lines of Professor Macqueen's amendment to this Association. Well, they at that time reduced the fees very considerably, and then they thought of entrance fees. They thought the profession would be amply satisfied. As Captain Russell said, a guinea for a man who kept a forge, and half-a-guinea for a man who had no forge, was not a great expenditure of money for the help he or his family might receive should unfortunate circumstances arise. He thought, speaking personally, and not as a member of Council of the National Mutual Defence Society, it would be a most serious thing if they should have any opposition to the scheme, especially of this character.

The CHAIRMAN said he thought the rule was not in force now that the man who had a forge should pay a guinea.

Captain RUSSELL: I pay half-a-guinea and I have no forge.

The CHAIRMAN: I only pay half-a-guinea.

Mr. MASON: I think that includes everybody, forge or no forge.

The CHAIRMAN: What was the old charge—five guineas a year?

Mr. MASON: We reduced it down to a guinea entrance and half-a-guinea a year.

The CHAIRMAN: I have been a subscriber for 30 years and I think I am a member of Council, but I am sorry to say that the meetings taking place in Manchester, which is a good way from London, I don't think I have attended a meeting.

Mr. MASON said the reason it had been termed the Manchester Society was that they had not been able to get men from a distance to attend; and, he didn't say it conceitedly, they had picked men who would work. If they looked on the Council they would find London men, Manchester men, Leeds men, and from different counties, but they found when there was any work to do they couldn't do it. It was an absolute fact that some gentlemen came from a considerable distance and paid their railway fares to look after the difficulties of their fellow practitioners, and the funds had consequently gone up. A delegate had asked for his rail-

way fare only in one instance, and they thought, as members of the Council, that in this instance they would pay it. He did not suppose anybody would ever ask again.

Mr. HOWSE: It has been well tried and exceedingly successful, and cannot be beaten.

Mr. MASON: I agree with Professor Macqueen and also with the Yorkshire men. If it does not do good in one way it advertises the society. Agitation never does any harm if carried on on legitimate lines.

Mr. GRESSWELL asked if they could not suggest that one year the meeting be held in London and another year in Manchester, and that it be not called the Manchester Society.

The CHAIRMAN: It is not the Manchester Society; it is called the National Veterinary Benevolent and Mutual Defence Society.

Mr. GRESSWELL thought the only thing to do was to put a little more life into the affair. He had been a member of the profession for 29 years, and he heard very little of that society until this agitation commenced. If the younger members of the profession, as well as the older ones, knew a little more about the society, and that it was going to be a benefit to them, they would gladly join.

Captain RUSSELL: Will you propose we join the Veterinary Medical Society in forming a new society, or that we support the National Society as it exists.

Mr. GRESSWELL: I propose we should not assist in a new society, but hold to the old one. We have no rules of the new society.

The CHAIRMAN: It is not meant to be a London society, but to extend to the whole of the British Isles. Very little has been done in it yet.

Mr. HOWSE eventually proposed: "That as the National Defence Association has been a successfully organised society on safe and liberal lines hitherto, it be further supported instead of a new society being created, at least until the new scheme is more fully known."

Mr. GRESSWELL seconded, and the proposition was carried.

A resolution submitted by Mr. C. Hartley on the subject of subscribing to agricultural societies, was next discussed, but ultimately, on the suggestion of the chairman, the proposer agreed to withdraw his motion.

The CHAIRMAN then stated that he was very sorry to tell them that Professor Pritchard, as they could see, was not there. The cause of his absence was through a letter he received from Sir Walter Gilbey, requesting him to go that day to examine some thoroughbreds and hackneys in Lancashire. He had written to him (the chairman), and hoped to be able to arrange to get there, but he supposed it was rather difficult to get across country, and, therefore, the professor did not appear. He hoped they would accept his apology for his absence.

The case he was about to relate was that of a dray horse that was purchased this season for a brewery, and a very good horse he was—a very nice gelding, indeed, and he cost about £90. He came in, and went to work for a few days, and then he had the usual attack of influenza. For that he had high temperature for a few days and seemed to get pretty well over it; in fact, he had quite recovered, was getting quite fresh, and being exercised with the idea of being again put to work. But one morning his (the Chairman's) attention was called to him, and he saw the horsekeeper, who thought he had been hurt in the box. When he (the Chairman) went down both the horse's hind extremities, in fact, hind-quarters, were very much swollen, indeed, right up to the top of the rump. He found the temperature raised and pulse also. He thoroughly examined the animal, and it struck him it was most likely a case of purpura. The swelling, he must say, was not diagnostic of purpura, because it was a swelling of the whole

quarter, and not that difference alone, for he did not see the round lumps they had with cases of purpura. However, as he could not make up his mind to anything else, he began to treat him for purpura, and the next day there was one spot on the nostril, which encouraged him to go on with the treatment. It went on, and swelling came in other parts of the body and bloody exudations from the skin. The sheath was very much swollen. This continued and ran on for some three or four weeks. In this case, as if the animal had not been troubled enough with purpura, he fell with laminitis. The purpura symptoms to a great extent disappeared, and then he had a bad attack of laminitis. When the symptoms of laminitis abated, then the symptoms of purpura returned, and thus he went on, first one and then the other, for some time; in fact, it was a case that pretty nearly broke one's heart to treat. They no sooner thought he was going on all right than the other symptoms came on. He (the Chairman) should just like to say a few words about purpura. First, about its pathology. He must confess he understood nothing about the pathology of purpura. From all he had heard, it was a disease that was very little understood. Then there was another thing which often struck him about purpura, and that was the question whether it was infectious or not. He daresay gentlemen in the room would be rather surprised at his having any doubt. Everybody that he had spoken to agreed that it was not infectious, and he, himself, was not going so far as to say it was, but it was a very extraordinary circumstance, where he had an attack of influenza in the stable and one case of purpura.

Mr. DICKINSON said that with regard to purpura and the contagious nature of it, he was quite convinced it was infectious. He had on one occasion a bay mare from Mr. Elsey sent to him to wait six or seven weeks at his place. It came from Horncastle Fair, with the usual dirty nose, and in the course of a day or two developed purpura. At the same time he had two five-year-olds in his own stable, and a cob eight years old, and they all three caught it. They all recovered, but the eight-year-old had it worse than any of them. All commenced with a dirty nose, and the infection was brought, no doubt, from Horncastle Fair. The mare was placed in a loose box, and the horses in his own stable were twenty-five feet away. With regard to laminitis, he had a horse that had laminitis three years, with dropped soles. He had laminitis this year in February, but got apparently right and went to work. He wore two broad bar shoes now with dropped soles, and was going sound on them. He believed that horse would get perfectly sound.

Mr. HARTLEY thought they would be very remiss if they did not offer to the PRESIDENT their best thanks for stepping into the breach and giving them a practical and instructive paper at a moment's notice. He regretted very much that Professor Pritchard was not there, as he was sure they should have learned something that would have been useful to them in their everyday life. With regard to purpura, he might say he had never personally had any reason to look upon it as a contagious or infectious ailment.

Mr. GRESSWELL joined in the discussion, and Mr. HOWSE having seconded the vote of thanks to the Chairman, who responded, the meeting terminated.

The members present afterwards dined together, the usual loyal, patriotic, and professional toasts being duly honoured.

E. C. RUSSELL, *Hon. Sec.*

NORTH OF SCOTLAND VETERINARY MEDICAL SOCIETY.

A MEETING of the above society was held on a recent date in Mollison's Restaurant, Market Street, Aberdeen. Mr. Anderson, V.S., Keith, president of the society, occupied the chair. This society, which was instituted three years ago, is rapidly growing in size and importance, as evinced by the large

increase of membership and the interest shown in it by the members. The following veterinary surgeons were present:—Messrs. Mackie, Aberlour; Seivwright, Tarland; Young, Aberdeen; Anderson, Keith; Barron, Echt; Mellis, Inverurie; Paterson, Cluny; Crabb, Aberdour; Bell, Montrose; Morrison, New Deer; M'Laren, Brechin; Wood, Turriff; Marsden, Banff; Dunbar, Aberdeen; Murray, Cullen; M'Donald, Aberdeen; M'Bryde, Strichen; Cowie, Cornhill; Skinner, Oldmeldrum; Moir, Bealington; M'Pherson, Huntly, etc., etc.

The meeting was the largest yet held under the auspices of the society, and met for the purpose of hearing papers read by Mr. Cumming, Brechin, on "Actinomycosis, and its Treatment"; Mr. Skinner, Oldmeldrum, on the "Humours of Veterinary Practice;" and a demonstration on caponizing by Mr. M'Gregor, Kintore.

A very interesting discussion followed, which was taken part in by a large majority of the members present, the subjects of "Tail-Ill" and "Joint-Ill" being discussed at considerable length.

A special meeting of the society was held at the close of the ordinary meeting for the purpose of reading and adjusting rules, proposing new members, and electing office-bearers for the ensuing year. Mr. C. Baxter, V.S., Elgin, and Mr. Crabb, Aberdour, were proposed new members of the society. The following members were elected office-bearers for the ensuing year:—President, Mr. Anderson, V.S., Keith, re-elected; vice-presidents, Mr. Young, V.S., Aberdeen; Mr. Seivwright, V.S., Tarland, re-elected. Members of Council, Mr. Paterson, V.S., Cluny; Mr. M'Bryde, V.S., Strichen; Mr. M'Gregor, Kintore; Mr. Howie, Alford; Mr. Mellis, Inverurie; Mr. Marsden, Banff; Mr. Thomson, Aberdeen, were all re-elected with the exception of Mr. Paterson. Mr. Skinner, V.S., Oldmeldrum, who has ably carried on the work of secretary since the society was instituted, gave in his resignation, as also did Mr. Wood, V.S., Turriff, who has been for some time acting as treasurer to the society. Mr. W. M'Pherson, V.S., Huntly, was appointed secretary and treasurer jointly.

BORDER COUNTIES VETERINARY MEDICAL ASSOCIATION.

(*Continued from page* 210.)

Before referring further to treatment let me say a few words as to complications and sequelæ of suppuration within the hoof. One of the most serious complications of suppuration within the hoof is necrosis. As the result of a bad prick or neglected bind in shoeing we often have necrosis of the laminæ and of a portion of the pedal bone. I believe this may be partly traced to the pressure on the soft tissues imprisoned between bone and horn, but we have also to remember the effects of pyogenic germs acting upon tissues deprived of a great part of their vitality. Irritative fever, too, often accompanies bad foot injuries, and septicæmia may ensue, and cause death in a few days

Necrosis of the lateral cartilages is a very serious sequel to suppuration, causing, as it does, prolonged fistula of the coronet. Nearly every case of quittor is due to diseased cartilage, but some are traceable to the presence of a portion of necrosed bone, whilst others may depend upon sinuses communicating with the inflamed sheaths of tendons. Purulent infection of the tendon-sheath is one of the gravest sequelæ of suppuration within the hoof, and very seldom yields to treatment. Purulent infection of the pedal joint I consider the very worst complication, for when it does not lead to a speedy termination by death of the horse it leaves him a useless cripple. Wherever pus is formed within the hoof it does great mischief, and is apt to spread or burrow. When at the front part of the foot it soon escapes at the coronet, and here may affect the pedal joint or infect the coronary tissue. When at

the back part of the foot it easily spreads into the loose tissue of the plantar cushion, and may thus reach the tendon-sheaths. This burrowing of pus is not entirely due to the mere increase in its bulk causing pressure, and thus running along the lines of least resistance. The pathogenic germs, doubtless, find an easy channel through the lymph and blood-vessels, and thus travel actively to a distance from the original seat of injury. This I take to be the explanation of the rapidity with which purulent infection spreads, and leads to the formation of abscesses and the destruction of articular or serous cavities.

Another grave sequel to suppuration is the effect produced upon horn-secreting structures. Necrosis and swelling of the coronary band leads to defective and irregular secretion of horn. Thus we have fissures in the wall, and other deformities of the hoof. The most common is the growth of the wall in an outward instead of a downward direction, causing a great bulging mass of horn. This, in time, may be rectified by the subsidence of the swelling at the coronet. The bulging mass should be rasped down repeatedly, and care is necessary to provide against uneven bearing of the shoe on the deformed part.

There are two special points in the treatment of suppuration within the hoof to bear in mind—to preserve the vitality of the injured parts, and to destroy the pyogenic organisms which keep the mischief going. As soon as pus is diagnosed an exit for it must be made through the horn. Lameness may exist without pus being present, and when the degree of lameness is such as to suggest that inflammatory effusion only has taken place, the question arises—Should we cut through the horn to see? The disadvantage of doing so is that we at once permit the entrance of organisms which may cause pus. Of course, if pus is present, the very worst thing to do is to leave it there, and therefore perhaps it is wise to err on the side of greatest safety by cutting through the horn in all cases of suspected or probable suppuration. But as soon as we have opened up the sensitive foot, whether pus is found or not, the essential treatment is the use of antiseptics. Every dressing or application to a wounded foot should be antiseptic, and fomentation or poultices which are not so are distinctly dangerous.

We can do little to maintain the vitality of the tissues in an injured foot, but we can avoid all treatment which lowers the vitality. Excessive and prolonged hot poultices, I believe, do lower the vitality, and the coronet too frequently suffers from this cause. The perpendicular position of the horse's limbs whilst standing is an aggravation to all inflammations of the foot, and therefore the use of slings should be avoided. If a horse can be induced to lie down, the pain due to suppuration in the hoof is lessened. It is difficult to make a horse lie down, and when down it is often impossible for him to rise again. Slings may be used to lift him and turn him over. An ounce of chloral is a good sedative, and will produce rest and cessation of pain for a time. Warm fomentations soften the horn and assist in allaying pain, but they should not be used when the horn is cut through unless made asceptic.

Removal of horn to afford an exit for pus should not be greater than is necessary for the object. To lay bare a considerable surface of sensitive foot is to court the protrusion of granulations, which increase the pain and effectually block the escape of pus from within. I think this protrusion is always greater when the surrounding horn is left thick and unyielding. Thin the horn with knife or rasp all over the injured part, and then make a small opening through it. This permits some yielding to the pressure of the swollen tissues within and does not favour protrusion of granulations.

This, gentlemen, is the general principle upon which I treat suppuration within the hoof.

For the final division of my subject I have left little time, and will make my remarks brief. What I call pseudo-navicular disease are cases of foot lameness presenting all the symptoms of the genuine disease, but yielding to a certain line of treatment. When a horse "points" his foot in the stable, constantly changes his weight from one foot to the other, runs out very lame but in a short time goes practically sound, where rest increases the lameness but action decreases it, I diagnose navicular disease. Ulceration of the navicular bone I believe to be incurable. Some horses, presenting every one of the symptoms I have mentioned, become sound and remain sound, so they cannot have real navicular disease. I cannot tell the pseudo from the real disease, so I now try the following treatment in all these cases. Sometimes it is successful, as often it fails. When successful I say the case was pseudo; when unsuccessful, real navicular disease. The treatment is to shoe with tips and have the horse exercised *every day*, and let him run in a loose box, not be tied up in a stall. The exercise commences with one hour a day and is gradually increased. No day is allowed to pass without exercise. When the treatment fails the lameness increases to a degree which renders the horse unable to trot, but many cases show a truly remarkable recovery from the continued exercise in tips. The use of the term pseudo-navicular disease is not to be understood as a claim to a discovery of a new disease. It is really a cloak for ignorance. I do not know what the morbid condition is, but I fancy it is some painful state due to malnutrition which is rectified by the increased circulatory activity forced upon the foot by exercise. I offer not the theory but the facts for your consideration.

Discussion.

The PRESIDENT remarked that Mr. Hunting's address was both valuable and interesting. He had brought a number of suggestions forward, and he hoped the paper would be discussed in the most liberal way.

Mr. RUTHERFORD said two or three things brought him there that day. One was the pleasure of hearing Mr. Hunting. He had not been disappointed. He largely agreed with the greater part of what had been said. The only thing he did not quite agree with was his treatment. He would have gone a little further in entering upon the surgical management of injuries of the feet, which largety affected the mortality. He could recollect the day when it was quite the rule for a "colic" case to die; and when it was common for one out of every two cases of influenza to die, and when a horse never recovered from a serious injury to the foot. He thought that the only thing that could lead one to suppose that there was a fracture within the horny box, was the absence of disease anywhere else, and the intensity of the lameness, with a puffy swelling at the coronet. He mentioned cases which had come under his observation. In one a horse was thrown, and the front of a cart fell upon the side of his hind foot, splitting the wall of the foot from top to bottom, and fracturing the bones internally. He had to be destroyed, and the pedal bone was now in one of the Colleges. In another case the horse had been resting a month or two, and one day when going a journey of about eighteen miles he fell lame suddenly. A blacksmith saw him and said there was nothing wrong to be seen with the foot. The horse was driven on to Edinburgh and lay down in his stable exhausted. The horse was shot, and it was found that the os coronæ was broken into three or four pieces. Referring to injuries to the foot from foreign bodies, he said he did not know anything that was more serious than tread in the coronet of the hind foot. In inflammation of the anterior of the foot the pain arose chiefly from the impossibility of the parts swelling to relieve themselves, and from pressure upon a highly sensitised structure. Ninety per cent. of cases required nothing else

than to be dressed with ordinary antiseptic, if attended to at once. In every case of severe prick wounds he stripped at once, so also where injury to the laminæ or a tendency to necrosis of the laminæ was involved. He had a collection of specimens where there had been a thin film of bone from the face of the pedal bone with laminæ attached, and where if it had not been removed at once there would have been small chances of escaping death from irritative fever. There was no difficulty in stripping for any injury of the wall. A man required to be an expert user of the knife—and no knife equalled the French knives—and he should have a little patience to go not down the line of the injury, as he apprehended Mr. Hunting desired, but to go a good deal on both sides of it. Strip the foot freely from top to bottom. He never went less than half way up, and he cut neatly out of the foot a square section, and then slit it in all directions. In the large majority of cases the irritative fever at once subsided. With regard to the sole, he did not agree that if they received immediate antiseptic treatment there was no danger of pricks from below. A certain number, in spite of all, would go wrong. He did npt agree either with the new-fangled mode of picking out these wounds as if you were scraping the teeth of a person. He thought there were cases where warm water aggravated pain. He had seen more benefit from cold water. Hot water tended to relax, weaken, and produce a swelling of tissues. He did not think that in many instances the treatment of foot injuries was wise, and a large percentage of cases were lost by simply not being thorough.

Mr. CARTER said he followed the practice of making a good opening in the case of a prick, but he followed Mr. Hunting's treatment with regard to antiseptics, and poured a solution of carbolic acid over the poultice. The germ theory of disease he considered was carried a little too far.

Mr. J. ARMSTRONG said he agreed with the strict use of antiseptics. The use of poppy heads with hot water was one of the finest things that could be used for alleviating pain. He had to deal with many small feet in racehorses, and he had found nothing like it. With regard to treads, they should be well washed out and dressed with iodoform.

Mr. ANDERSON commended belladonna as an alleviative.

Mr. H. THOMPSON said that in cases of foot injury his first point was to get to the bottom of the injury and make a good opening to expose it. His next point was to reduce the inflammatory process, at the same time keep up the vitality of the part. That was the great secret. He could not tell why men should make use of hot water. Let cold water be used, for it extracted the heat from the foot into the poultice, and in twenty minutes or half-an-hour both were about equal. He found out forty years ago, in the pit bottom, that cold water was much superior to hot. It gave a tone to the healthy structures and kept up the vitality and physiological action which greatly assisted in throwing off the diseased tissue.

The PRESIDENT said the discussion seemed to turn upon the question of hot and cold water. They each had their sides and would continue to stick to them. As regards the antiseptic treatment he was inclined to follow Mr. Hunting. If quittors could be kept absolutely under the treatment of antiseptics, without the presence of air in contact with the wound, there would be greater success in the treatment of these unsatisfactory injuries. He had found that the hot iron gave the most satisfactory results, followed by either iodoform or perchloride of mercury as antiseptics.

Mr. HUNTING replied. He observed that he had to thank Professor Rutherford, not only for discussing his paper, but supplementing it. In fractures, a bulgy coronet was not always in evidence, and could not always be relied upon, and in its absence fractures were simply undiagnosable: all we could claim was simply a good guess. He had had no experience with poppy heads or any other medicament in fomentation; and he had never used

opium, morphia, belladonna, or any sedatives. Mr. Thompson liked all injuries well bottomed. He objected to mysteries of all kinds, but he did not go so far as Mr. Thompson or Mr. Rutherford in opening up the hoof. In most acute bad injuries he allowed that Mr. Rutherford was right. He did not like cutting through horn unless he was obliged to. If it was good practice in all inflammatory cases, why not do it for laminitis? Mr. Thompson ridiculed the hot-water treatment, and spoke in such a way about it as to give the idea that he doubted a man's intellectual capacity. He could not reconcile these things. He would take the good advice of the President and would speak well of the bridge that carried him over. It was very strange that cold water and hot water should be used by different veterinarians for precisely the same pathological conditions, and with success.

At the conclusion of the discussion a hearty vote of thanks was accorded to Mr. Hunting for his paper on the motion of Mr. Armstrong, seconded by Mr. Hewson.

The members were then entertained by the president to a sumptuous dinner in the hotel.

A feature of the after proceedings was the performance on the bagpipes by Mr. Henderson, V.S., of Hexham, an enthusiastic Scot, the depth of whose patriotism is shown by his love of the kilt and the pibroch. He has made himself master of the instrument, and not only were the members of the Society highly entertained by his spirited and clever playing, but a large crowd of hotel guests and other visitors were attracted to the hotel garden by the unusual music. Mr. Anderson also ventured out in a boat on the lake with his beloved pipes, and the weird music was plainly heard for a great distance, and the performer was quite the lion of the hour. The post-prandial proceedings were further enlivened by excellent songs and the music of an orchestral band provided for the occasion.

A number of toasts were honoured, "The Queen," "The Prince of Wales and the Royal Family."

Mr. H. THOMPSON proposed "The health of Mr. Hunting," thanking him sincerely and heartily for coming such a long distance to give them the interesting paper. He considered that a deep debt of gratitude was due to Mr. Hunting, but hoped he had been slightly repaid by the beautiful lake and scenery, and trusted he would not be long in coming amongst them again. The toast got the real musical honours.

Mr. HUNTING replied, and said he would like the privilege of giving a paper once a month if he could always have such a genial company and beautiful surroundings, and he now had pleasure in proposing the president's good health and success. This was received with musical honours and enthusiasm.

The proceedings of the meeting can hardly be said to have concluded with the dinner on Friday night. Most of the members present took advantage of their visit to stay over the following day, and on Saturday morning it was with some amusement, not to say surprise, that about six o'clock the pipes were heard in a festive "lament" on the lake again. Early in the forenoon Mr. Anderson, who had attired himself in his kilt, pleased the company by appearing in the full native costume of his clan. He accompanied a party of members in a steamer to Lake Side, and played frequently on board, and headed the procession from the landing stage to the hotel. The meeting all through was a most happy, successful, and enjoyable one. The weather was brilliant, and the beautiful scenery was observed at its best and brightest. The gathering was one which will live in the memories of all who had the privilege of accepting the generous invitation which had been extended by the President, and before the separation of the members it was the general talk that the annual meeting should be changed from the winter month to that of the

summer, and be at the rendezvous at the Old England Hotel, Bowness-on-Windermere, as one and all departed regretting that they could not spend more time to enjoy the attractions there spread out before them.

All were highly pleased with the catering and courtesy extended to them by Mr. and Mrs. Bowness, and although eighty visitors were on the premises every care and attention was extended to the members of the Association.

CONTAGIOUS DISEASES ANIMALS ACT, 1894 and 1896.

SUMMARY OF RETURNS OF OUTBREAKS, for the four weeks ending August 21st, 1897.

ENGLAND AND WALES.

Pleuro-Pneumonia.	Swine Fever.	Glanders. (including Farcy).	Rabies.	Anthrax.	Sheep-Scab (for month of July.)
None *	Outbreaks 120 Slaughtered 2,155	Outbreaks 62 Attacked 98	Dogs 10 Other Animals 2 Destroyed 8	Outbreaks 30 Attacked 81	Outbreaks 12

SCOTLAND.

None	Outbreaks 2 Slaughtered 184	Outbreaks 3 Attacked 17	None	Outbreaks 3 Attacked 3	Outbreaks 3

IRELAND (for the four weeks ending 7th August).

None	Outbreaks 44 Attacked 188	Outbreaks 1 Attacked 1	Dogs 42 Other Animals 12 Destroyed 98	None	None

THE MEDICAL SCHOOLS.

MR. W. LONG ON VETERINARY SCIENCE.

AT several of the medical schools in connection with the metropolitan hospitals, addresses were delivered yesterday on the occasion of the opening of the Medical Session.

In the presence of a large gathering of prominent men in veterinary science

* Eight head of cattle slaughtered as suspected.

and the students assembled yesterday in the theatre of the Royal Veterinary College, in Camden Town, Mr. D'Arcy Power, M.B., F.R.C.S., delivered the introductory lecture at the inauguration of the winter session.

The chair was taken by Sir Howard Vincent, M.P., one of the Governors, and among those present were Mr. Walter Long, M.P., the Minister of Agriculture, Veterinary-Major F. Smith, Colonel Lambert, Sir Nigel Kingscote, Professor McFadyean, the Principal, Professor Brown, Mr. Elliott, Secretary to the Board of Agriculture, Professor Axe, Professor Penberthy, and Mr. Richard N. Powys, the Secretary to the College.

In the course of his address Mr. D'ARCY POWER dwelt upon the debt that human medicine in all its branches owed to veterinary science, remarking that the debt of human physiology to veterinary physiology was well recognised. Veterinary medicine sometimes gave valuable hints to the human physician about the use of drugs, and the cause or the treatment of various diseases, which, although they were common to man and animals, were more common in animals. Until quite recently, however, the importance of veterinary science to physicians had never been better shown than in connection with the life history of the more common entozoa, some of whom used our bodies as an intermediate host in the cycle of their existence, which they renewed in cattle, dogs, or rodents. The better and wider knowledge of pathology possessed by the best veterinary surgeons was sometimes brought home to medical men in a very practical manner. There was no wonder, therefore, that comparative pathology rose daily higher in the estimation of the medical profession, for, to the thoughtful physician, its problems appeared identical with those he was most often called on to solve. Daily, too, they saw that prophylaxis was the most important part of medicine, and it was exactly in the study of prophylaxis that comparative pathology excelled, though it had done good service in pointing out the part pl yed by animals in sharing diseases which affected man. In doing so it had shown that animals might act as transmitters of disease, so that cats and pigeons in diphtheria, horses in influenza, and rats in the plague must be considered as probable rather than as possible carriers of disease. The question of prophylaxis was essentially one which had taken its rise on the veterinary side of the profession, for it was one with which veterinary science was particularly fitted to deal. It would occur at once to everyone that we owed to veterinary science the germ of that great discovery which bade fair to render this century as epoch making in medicine as it was in steam, electricity, and engineering. Referring to several of the great economic advances which had been made within the last few years in connection with the examination of cattle consumed as human food, he said that, after many years, the Government had been made to feel the necessity of enforcing the application of sanitary measures, and medical officers of health came into existence. In a tentative manner, and very incompletely, some attempts had been made to produce a veterinary sanitary service. Too much was left to the initiative of local bodies, and what had hitherto been done in detail now required to be established upon a broad groundwork. Such a service, properly conducted, would be of undoubted service to the community, whilst it would be advantageous to the veterinary profession. The rudiments of such a service already existed, but he thought that it might be much better organised, much better worked, and much better paid. The duties of veterinary inspectors at the present time appeared to be of far too limited a nature. They were confined to carrying out the provisions of certain Acts of Parliament for the prevention of contagious disease occurring in animals. He would have it far otherwise. He would place the whole of the animal hygiene under the care of a veterinary sanitary service, and as no one could be much in advance of his time, such a service for the present should be carried out along the lines which had been found most

useful in the medical sanitary service, care being taken to eliminate, or, if they could not be altogether eliminated, to strengthen those points which had seemed weakest in the working of the Public Health Acts. Such a veterinary sanitary service would not be hard to organise. Its existence was already foreshadowed, for the State had recognised that the medical officer of health could not be omniscient. The veterinary colleges must therefore be ready to give additional teaching facilities, not only in the questions of meat inspection and the qualities of milk, but also in the geological and climatic conditions as they affected animals. The veterinary sanitary service would also adopt a system of careful notification of all cases of infectious diseases. If such a system were carefully carried out in connection with rabies, and if every owner of a dog was compelled to attach a registered label to it, to be renewed at first at short intervals, the ownerless dogs could soon be eliminated, and hydrophobia would become as rare as leprosy in England.

Mr. W. LONG, M.P., who was warmly greeted, proposed a vote of thanks to Mr. D'ARCY POWER, and bore testimony to the valuable assistance which the Board of Agriculture had received from the veterinary profession, upon whom they were so dependent for the successful enforcement of legislation. He was glad to think that during the time he had been at the head of the Department it had laid in his power to extend in some small degree the powers and duties of veterinary officers throughout the country. They had, he hoped, already given them opportunities in connection with the administration of the Swine Fever Acts to exercise a wider discretion, and they had certainly thrown upon them greater responsibilities. He had no hesitation in saying that the Department congratulated itself upon the step it had taken, which had been attended with signal success. With regard to veterinary inspectors at the ports, the Department had been able to raise some from temporary to permanent officers, and he had no doubt that as time went on they would be able to extend those promotions. The Board of Agriculture not only realised how closely it was dependent upon the veterinary profession for the successful administration of the Acts for which it was responsible, but they also recognised the value of the work that was done by veterinary surgeons throughout the country, and they were most anxious to set their seal upon the record of their work in any way that was possible.

Legal News.

THE INTERESTING GREYHOUND CASE.

THE hearing of the case was resumed in which Mr. Thomas Graham, greyhound breeder and trainer, Great Corby, claimed the sum of £50 from Captain McCalmont, M.P. for one of the divisions of Antrim, being the price of a greyhound sold to the defendant by the plaintiff in June, 1896. The defendant counter-claimed £20, a sum which the plaintiff had agreed to pay him at the end of the greyhound's racing career if the dog was returned to him.

Mr. Lightfoot was for the plaintiff, and Mr. Rose Innes, barrister, London (instructed by Messrs. Cartmell and Burnett, as agents for Mr. R. E. Campbell, London), for the defendant.

The evidence for the plaintiff, taken at a previous Court, was that Captain McCalmont, Mr. Dixon, his agent, and Mr. L. Hall went over to Great Corby on June 27th, and saw Mr. Graham's dogs, one of which Captain McCalmont purchased for £50. The animal was kept at Corby for about a month on account of a sexual complaint, and was then sent to Mr. Dixon's place at Banbridge, in the North of Ireland. A few days after its arrival, the dog died from acute pneumonia. The plaintiff's evidence was to

the effect that the bitch was in good health when it was sent off. From Mr. Rose Innes's opening at the last Court, it appeared that the defence was that the acute pneumonia, from which the bitch died, was of long standing, and that there had been a breach of the implied warranty that the dog was fit for racing purposes when she was sold. Captain McCalmont and Mr. Dixon, his agent, gave evidence at the previous Court.

Mr. Rose Innes, this morning, called John Forsyth, who is in the employ of Mr. Dixon, at Banbridge. He stated that he went to Belfast on July 21st, 1896, to meet the bitch. The bitch arrived packed in a hamper, and he unpacked it, and took it to a lodging-house for the night. The bitch slept on the bed with him all night. As far as he could judge, it was then all right. The animal refused food, however, and at Banbridge could hardly walk. It died a few days afterwards. In cross-examination, the witness said the boat by which the dog crossed from Stranraer to Larne was some hours late.

Mr. Hugh Chambers, V.S., of Banbridge, who made a *post-mortem* examination of the bitch, said the cause of death was acute pneumonia. There were adhesions between the apex of the left lung and the breast-bone. These adhesions were very firm and old. From the fact that the adhesions were firm, he judged that there had been a previous attack. He judged from the firmness of the attachment, and their fibrous nature, that the adhesions were old. Delay on the journey would bring about acute pneumonia, but would certainly not bring about the adhesions. Supposing the dog had these firm adhesions on the day on which it was sold, it would not be in a fit condition for racing purposes. It was possible the adhesions were the result of distemper. In cross-examination, the witness said he did not mention in the certificate he gave at the time of the *post-mortem* that the adhesions were old. The fact that the adhesions were of old standing was an important fact in this case. The pneumonia was not of old standing, but the adhesions were of old standing. Ther was a quantity of bloody serum in the chest; the bitch could not have lived long with that quantity of serum in its chest. The adhesions must have existed for some months. It was quite possible Forsyth might not have noticed anything the matter with it on its arrival. It was also possible that Captain McCalmont, Mr. Dixon, and Mr. L. Hall might not have noticed anything wrong with the bitch when they visited Corby.

Mr. Lightfoot: Is it possible that you might have made a mistake?

The Witness: In what way?

Mr. Lightfoot: In your evidence?

The Witness: I don't think so.

In re-examination, the witness said it was impossible for the adhesions to be formed in five or six days. He had to cut the lungs away with a knife; they gave away when being torn.

Mr. J. W. Hewson, V.S., of Carlisle, gave evidence in support of the conclusion that the adhesions were of long standing. Adhesions formed quickly, but it took a long time for them to gain firmness. A dog suffering from these adhesions was not fit for racing purposes. In cross-examination, the witness said there was no fact on Mr. Chambers' certificate to show that the adhesions were of long standing. Judging from the evidence, he should say that the adhesions had been formed some weeks before the dog died. They might have been there, and not have been noticed by Mr. Graham and other connoisseurs.

Professor McQueen, of the Royal Veterinary College, London, deposed that if Mr. Chambers had accurately described the condition of the bitch when he made the *post-mortem*, the facts were consistent with the adhesions qeing of old standing. Recently formed adhesions were easily crushed and

severed. The adhesions that required cutting must have existed in the dog's chest for several weeks at least. Distemper was a very likely antecedent to chronic adhesions of the chest. A large quantity of fluid would not be favourable to the formation of adhesions. If the adhesion was of the same age as the lung disease, there was no reason why it should prove firmer than the lung.

Mr. Rose Innes: My friend suggested that the lung would give way first?

The Witness: I attributed that to his want of knowledge.

Mr. Rose Innes: You mean his want of veterinary knowledge. We all admire his legal knowledge.

Mr. Lowingham Hall, of Carlisle, "Vindex," of the *Sportsman*, said he was present when Captain McCalmont purchased the dog. Captain McCalmont wrote him that he was coming through to Carlisle to see Mr. Graham's dogs, and said he would also like to see the Duke of Leeds' dogs, which were under his (witness's) charge. Captain McCalmont lunched with him, and they drove over to Corby. He did not go as an expert, but he was present when the dog was purchased. It was quite understood that the dog was required for racing purposes. The dog was a little thin and light, but looked very clean and healthy.

This closed the case for the defendant, and Mr. Lightfoot proceeded to call rebutting evidence on behalf of the plaintiff.

Professor Williams, Principal of the New Veterinary College, Edinburgh, deposed that there was nothing in Mr. Chambers' original certificate to indicate that the disease was of long standing. He had experimented with a view to find in what time adhesions could be formed. He found that within twenty-four hours false membranes formed in the chest, and that these adhesions could become fully developed and firm in from three to four days. The fact that the adhesions had to be cut away in this case indicated that they were firmer than the lung tissue. There was nothing inconsistent with the possibility that the whole disease occurred within three, four, or five days. If the adhesions had existed for as long as Mr. Chambers supposed, the fact must have been noticeable to a person who knew anything about a dog.

Mr. Rose Innes: Do you think that I, for instance, would have noticed anything with the dog?

The Witness: I have such a high opinion of you that I think you would.

In cross-examination, the witness said the person who made the *post-mortem* had the best opportunity of judging in a case like this.

By his Honour, Distemper was a disease which might give rise to adhesions.

Mr. John Bell, V.S., Carlisle, said there was nothing in Mr. Chambers' evidence or certificate which was inconsistent with the idea of an acute attack. On the contrary, they pointed to the disease being of short duration. The bitch got through the distemper without any medicinal treatment, and there were no complications. Her brother had to be killed.

In cross-examination, the witness said that very frequently during *post-mortem* examinations veterinary surgeons disagreed as to the age of adhesions.

Mr. Rose Innes: Who has to decide when doctors disagree? Why, the lawyers!

Mr. Bell: Well, they differ sometimes.

Mr. Rose Innes, in summing up the case, said whatever conclusion h Honour arrived at he would probably agree that both parties were fightin *bonâ fide*, because each believed he was in the right. There had, he sub mitted, been a breach of the implied warranty that the dog was fit for racing purposes when it was sold. The skilled evidence went to show that the adhesions were of long standing, and he suggested that they were probably

due to the distemper from which it suffered in the spring. As he said at the last court, nobody charged Mr. Graham with having attempted to palm off a dog which he knew to be unhealthy.

Mr. Lightfoot contended that in a case, like the present, where the purchaser inspected the dog, the question of an implied warranty did not arise. The sole question was, Did the purchaser at the time of the sale rely on his judgment, or on the skill of the seller? Did Captain McCalmont in this case rely on the skill and judgment of Mr. Graham, or on his own? Was it probable that if Captain McCalmont relied on Mr. Graham's judgment, he would have gone to Corby with his trainer, and accompanied by Mr. L. Hall, who was the greatest judge in the North of England? But, assuming that there was an implied warranty, the evidence was that the dog looked in perfect health, and was perfectly well until the day after its arrival. There was nothing to show that it was in any way suffering from any illness or disease; and the most probable thing was that it died from the effects of cold caught on the voyage from Stranraer to Larne. The evidence of the veterinary surgeons, coupled with all the evidence, pointed to the fact that the dog was in perfect health on the 26th June.

His Honour, in giving judgment, said there were at least two issues of fact for him to determine. One of the questions was, was there anything the matter with the dog up to the time of its sale? Upon that point he was satisfied that if there had been anything the matter with the dog the plaintiff would have got to know of it. One proposition he had to consider was, did the defendant rely on the plaintiff's skill and knowledge. No doubt the defendant did rely on the plaintiff to a certain extent, but he also relied on the pedigree, and also on his own skill and judgment, and the skill and judgment of the two very experienced gentlemen who accompanied him. He could not see why the defendant took those gentlemen with him unless it was to assist him in forming a judgment. Considering the question as to whether there had been a breach of an implied contract if one existed, his Honour said no one had the slightest idea that the dog suffered from any illness until Mr. Chambers made the *post-mortem* examination. He was satisfied that if there was anything the matter with it at the time of the sale the defendant and his friends would have noticed it. In his opinion, Mr. Chambers had made a mistake in his *post-mortem*, and he agreed with Professor Williams and Mr. Bell that the adhesions were not of long standing. His judgment must be for the plaintiff for the amount claimed. Incidentally, his Honour said he had never heard a straighter-fought case.

ALLEGED MISLEADING WARRANTY.

Railton Hetherington, of Long Island, Carlisle, brought an action against Messrs. Richard Harrison and Son, auctioneers, to recover the sum of £30 9s. 8d., the price, less commission, of a bay mare sold at the defendants' mart on April 15th. Hilton Middleton, of Low Burnthwaite, the purchaser of the horse, was brought in on an interpleader summons, and was the virtual defendants.

Mr. Jackson appeared for the plaintiff, Mr. Broughton for Messrs. Harrison, and Mr. Lightfoot for Mr. Middleton.

Mr. Lightfoot, who opened the case, said Mr. Middleton purchased a mare belonging to the plaintiff at Messrs. Harrisons' Mart on April 15th for £32. The horse was specifically warranted in the catalogue as being sound, but when it was taken home it was noticed that it flinched on the near foreshoulder, and was returned within the time specified in the conditions of the mart.

Hilton Middleton said something was noticed with the mare after it was taken to his place, and he called in Mr. Hewson, who gave a certificate of unsoundness. In consequence of that he returned the horse to the mart. The horse was resold, and was again purchased by the witness for £20. In cross-examination, the witness said the horse was purchased on the Thursday, and on Friday drew eight bags of oats from Wreay Station, and ploughed. No complaint was made to him until Saturday afternoon, when the horse was put in the harrow.

Three men in Mr. Middleton's employment gave evidence to the effect that the mare went lame while at work; and Mr. Hewson, V.S., and Mr. Armstrong, V.S., of Penrith, to the effect that the lameness must have existed at the time of sale.

Mr. Jackson called the plaintiff, who stated that he bought the mare in October, 1896, from the manager at Scaleby Castle. He worked her every day, and on the morning of the sale. She was a good worker, and was never lame. The mare was lame on the day she was returned. She had evidently suffered an injury since the sale.

Mr. Bell, V.S., who examined the mare on the day after she was returned, said he was of opinion that she had received an injury a day or two before. The mare's condition must have been noticed at the time of sale if she was then in the condition in which he saw her. In his judgment, the mare's injury had been received after the sale.

William Beckton, farm bailiff at Scaleby Castle; Daniel Gray Moffatt, coal retainer; David Norman Emsley, carter; Matthew Barker, Belle Vue, Christopher Little, Chapel Hill, Wreay, and Mr. W. McKie, V.S., also gave evidence for the plaintiff, tending to show that the horse was sound at the time of the sale.

His honour, having inspected the horse outside the court, said he was satisfied that the horse was sound at the time of sale, and that therefore it received an injury while it was at Mr Middleton's. There would therefore be judgment for the plaintiff against Mr. Middleton, who must pay the costs of the plaintiff. The auctioneers must pay their own costs, because they had not complied with their own rules and given the parties notice that they intended to hold a trial of the horse after it was returned to the mart.—*East Cumberland News.*

AN ADDRESS ON THE WORK OF PASTEUR AND THE MODERN CONCEPTION OF MEDICINE.

Delivered before the British Medical Association at Laval University, Montreal.

BY PROFESSOR CHARLES RICHET,

Delegate of the French Government and of the Faculty of Medicine of Paris to the Sixty-fifth Annual Meeting of the British Medical Association.

MR. PRESIDENT, LADIES AND GENTLEMEN,—It is not without emotion that I rise to address this learned assembly. I know, indeed, that I am addressing men who are not my fellow citizens, but among them are some, *enfants de notre vieille nation Gauloise*, who have the same mother tongue as we; they speak from childhood our beloved French language, they are thus a little more than my fellow citizens, for they are my compatriots, and I feel myself animated by a truly fraternal affection for them; and as to my English colleagues, they have given evidence of so much goodwill, and of a courtesy

so delicate, that I need make no great effort to assure them of my gratitude. In one word, although a stranger, I seem to be among friends.

I am somewhat troubled, also, because I am addressing medical men and am speaking before a medical congress. Now, although I belong in some small degree to the great medical family, since my father has conferred honour upon the profession of medicine by his labours and by his works; and although I have the great honour to be the delegate of the Faculty of Medicine of Paris, yet I am not a medical man, and a physiologist displays some temerity in venturing to speak before you on medical matters.

The Reconciliation of Medicine and Science.

Still, I have an excuse. It is this, that I desire to attempt to bring about a complete reconciliation between medicine and science. It may seem that this is a commonplace, and that any such attempt would be unnecessary. But it is not so, gentlemen. We might find, perhaps, somewhere, not, I am sure, in this assembly, medical men ready unhesitatingly to assert that there is discord between medicine and science, and that all those sciences which are called ancillary—physics, chemistry, physiology—are *impedimenta* with which the clinician has nothing to do. Yes, there are to be found in the world medical men, among them even men of high attainments, who are ready still to say: "What have I got to do with your experimental science? Observation of the sick and clinical study are worth more than all your clever experiments, and it is not from laboratories that the means of curing disease can come." Such an opinion appears to me to be erroneous, and I would with all the energy which I possess help to upset it. I hold that it is by experimental science alone that medicine has made and can make progress. It will suffice to describe the work of Pasteur, my illustrious master, in order to give you a convincing demonstration of this.

I shall not be contradicted when I say that the value of this work is greater than all that the history of medicine has given us since the commencement of our era. Through his labours everything has been renewed, regenerated, and, thanks to him, medicine has made more progress in twenty years than had been made previously in twenty centuries.

The Life-Work of Pasteur.

Louis Pasteur was born at Dôle, in the Jura, in 1821, and at the beginning of his career gave himself up to the study of chemistry. He became deeply interested in a difficult and important problem, molecular dissymmetry. Here was a question in pure chemistry which would seem to take us very far from medical questions, but it was to lead Pasteur directly to the study of fermentations. If a solution of tartaric acid (in the form of tartrate) be left untouched, a change occurs, after some time, in the chemical constitution of the liquid, which before Pasteur's time had been overlooked. The original solution has no action on polarised light, but after fermentation this same solution has become capable of deflecting polarised light. Pasteur explained this phenomenon by showing that the original tartaric acid is a mixture of an acid deviating light to the right with an acid deviating it to the left, and that a process of partial decomposition takes place; one of the acids is destroyed and the other is not altered, so that the action upon polarised light, previously masked by the mixture of the two acids, becomes evident. Here we have a fundamental experiment. It is told how when the young Pasteur desired to show it to Biot, that great physicist, who had discovered the phenomena of polarisation, the old *savant* grasped the trembling hand of the young man,

and, before beginning the optical examination of the crystals submitted to him by Pasteur, said to him with tears in his eyes, "*Mon cher enfant*, I have loved science so much, that in face of the beautiful experiment which you relate to me I cannot prevent myself from being deeply moved."

The explanation given of this phenomenon at that time was that the tartaric acid was decomposed by fermentation. Men were then content to use this magic word, which appeared to explain everything, but which, in reality, told nothing at all. Neither Lavoisier, nor Liebig, nor Frémy had been able to discover its meaning, and were reduced to the theory of half-organised matter —a childish conception worthy of Paracelsus.

One of Pasteur's experiments, perhaps the most beautiful which he ever made, demonstrated the nature of this mysterious phenomenon. If a sugary solution of carbonate of lime is left to itself, after a certain time it begins to effervesce, carbonic acid is evolved, and lactic acid is formed, which decomposes the carbonate of lime to form lactate of lime. This lactic acid is formed at the expense of the sugar, which disappears little by little. But what is the cause of this transformation of sugar into lactic acid? Well, Pasteur showed that the efficient cause of this chemical action was a thin layer of organic matter; that this layer of organic matter consisted of extremely small moving organisms, which increased in number as the fermentation went on. Their growth it is, then, which produces the phenomenon of the transformation of sugar of milk into lactic acid. If, for example, we take a sugary solution in which all pre-existing germs have been destroyed by heat, no lactic fermentation will take place. But if we introduce into this sterile liquid a small quantity of this layer of organic matter, such as can be obtained from any liquid in which normal lactic fermentation is taking place, we shall see the lactic acid again form rapidly in the new solution.

Let us dwell a little on this admirable experiment. Nowadays it seems to us so extremely simple that we can scarcely perceive its importance. It seems to us now, in 1897, that from all time we must have known that an organic solution when heated was sterile, and that a germ would suffice to render it capable of fermentation. But this is a mere delusion. No, a thousand times no! This great fact of the generation of germs was absolutely unknown before Pasteur, and the method of sterilising liquids, and of their inoculation with spores, was revealed to us by Pasteur. It is the nature of great discoveries that they become popularised in a short time, and thus very quickly become elementary. A first year's medical student knows perfectly that which neither Lavoisier, nor Liebig, nor Fremy, nor any one before Pasteur had been able to perceive. We are always tempted to be ungrateful to great creators, for their creations pass rapidly into the domain of common knowledge. They become so simple that they cease to surprise us. We do not think of being grateful, and we forget the efforts which genius has had to make to wrest the truth from jealous Nature. Gentlemen, let us not be ungrateful, let us remember that the recognition of the real cause of all fermentation (the development and germination of organised elements) dates from 1857, and from the celebrated memoir of Pasteur upon lactic fermentation. A new world was then opened to science.

Nevertheless, this memoir of Pasteur's, containing one of the fundamental discoveries of the century, was not welcomed as it ought to have been. At first its importance was not understood, and afterwards absurd contradictions were opposed to it. A whole series of beautiful and decisive experiments were necessary to prove that there was no such thing as spontaneous generation, and that sterile liquids remained sterile indefinitely so long as no germs were introduced into them. Pasteur devoted six years (1857-1863) to the proof of the fundamental fact

a t "organic liquids do not alter until a living germ is introduced into them, and living germs exist everywhere."

(*To be continued.*)

THE FLOATING CARTILAGE IN JOINTS.

BY W. J. MARTIN, V.S., KANKAKEE, ILL.

A FEW months ago I was called to an adjoining city professionally; while there I was requested by a gentleman to examine the hocks of his young stallion, two years of age. On manipulation of the left hock-joint a small, hard, nodular body could be felt on the internal aspect of the joint. The body was situated within the true joint—that is, behind the capsular ligament and synovial membrane, and was fouud to be floating free in the synovial fluid of the joint. The colt had never shown any symptoms of lameness, nor was the joint enlarged at any point. A diagnosis of a floating piece of cartilage within the joint, without any apparent structural changes in the articulation, was made out.

In a practice of nearly fifteen years, this is the first case of floating cartilage in a horse's joint that has come under my observation, although I have no doubt that they are more common than we are aware of, could we but detect their presence in joints. There is no doubt in my mind that in the horse loose pieces of cartilage in joints are often the cause of many cases of obscure lameness, such as "cramp" of the hind limbs of young horses, in which cases the limbs are often most rigidly locked, admitting of neither tension, flexion, nor rotation. Loose pieces of cartilage may also be the cause of acute arthritis when, owing to the amount of swelling present in the joint, detection of the pieces may be overlooked, or they may become fastened to some part of the joint by the resulting inflammation.

Floating cartilage in joints is quite common in man, and is often the cause of so serious a disorganisation of joints as to render amputation necessary. The composition of these hard bodies found in the joints of many vary, some being composed of numerous layers of compressed fibrin, while others are made up of portions of ossifying cartilage, and in reality are true bone. The causes which give rise to the presence of these loose pieces of cartilage in joints are various; perhaps the chief one is that as the articular cartilage derives most of its growth and nourishment by imbibition from the network of fine bloodvessels that terminate near the shaft of long bones which go to make up an articulation, any redundance of their cartilage might be accounted for by a too rapid growth of the cartilage within the joint at a certain point, which, becoming loosened from the parent bone, floats off in the synovial fluid in the joint. Again, the formation ot these morbid growths in joints is due to other causes, any one of which acting separately may give rise to them.

In some cases clots of fibrin may become solidified together; the presence of this clotted fibrin may be due to inflammatory exudation taking place within the joint. In other cases, blood may become extravasated into a synovial hinge, and there, becoming organised, break off and fall into the joint-cavity; or it may remain attached by a pedicle, and thus hang pendulous in the joint until it becomes caught between the ends of the articulating bones forming the joint, thus giving rise to sudden and severe lameness. In other cases the cells of the villous portion of the synovial membrane, which contain a few cartilage cells, may become enlarged from acute or subacute arthritis, and drop into the cavity of the joint. Sometimes a piece of the articular

cartilage, together with a small piece of the bone, may, after an injury, be forced into the joint, causing inflammation and severe lameness. In osteo-arthritis the edges of the articular cartilage become much thickened and calcified, and sometimes these break off and fall into the joint. The size of these bodies found in human joints may vary from the size of a millet-seed to that of a walnut, and as many as sixty of them have been removed from a single joint.

In the human patient the symptoms of loose pieces of cartilage when they become caught between the ends of the long bones of a joint are most characteristic, such as sudden and acute pain in the joint, often extension, flexion, or rotation is impossible, and the patient will often fall to the ground if unsupported. The offending body may sometimes be seen producing a bulging outward of the skin covering the joint when situated superficial, or if deep-seated within the joint it may be felt as a hard nodular body, which will sometimes slip from one side of the joint to the other. There appears to me no good reason why a disease which causes so much pain and suffering in the human species might not also be the cause of many pathological evils in the equine species. I think that this is a subject that may well engage the attention of veterinary pathologists, to render clear to us some of the lesions due to floating cartilage in equine joints.

INOCULATION AT ROCKHAMPTON.

THE Minister for Agriculture (the Hon. A. J. Thynne), has received a private letter from Mr. Archer, of Gracemere, near Rockhampton, in which that gentleman gives some interesting details of inoculation experiments carried out by him. Mr. Archer took four bullocks, one of which he inoculated with the blood of a beast which had had an attack of tick fever and had recovered, another with blood taken from a beast suffering from a virulent form of the disease, the two remaining bullocks being left uninoculated for control purposes. The four beasts were then put into a highly infested paddock. The two control animals died of tick fever; the one inoculated with virulent blood got very sick, but recovered; the beasts inoculated with the blood of the "recovered" bullock did not suffer from the disease at all. It will thus be seen that confirmation of Mr. Pound's theory has come from another source entirely.

INFLUENZA.

BY GEORGE GRESSWELL, M.A. OXFORD AND CAPE OF GOOD HOPE, L.R.C.P., L.R.C.S.EDIN., L.F.P.S.GLASG.

THE recent extensive acquaintance with epidemics of this disease in a virulent form, not only in this country, but throughout the world, is perhaps one of the most instructive and important experiences of the last few years. True it is that, looked at from one aspect, influenza may be classed as a minor scourge. It is well that this is so, because science seems as yet almost completely powerless in arresting its spread. As a rule, when properly managed and skilfully treated from the outset, patients do not succumb. Unless dangerous complications are present at first or arise in the course of the complaint, the percentage of deaths is only small. Nevertheless, as is well known, very large numbers of people have been affected and rendered incapable. Not only is it the case that whole communities are liable to be

stricken down, but it is also a fact that the victims are prostrated with marked nervous, febrile, and catarrhal symptoms, and are afterwards liable to be attacked with distressing and debilitating sequelæ.

One of the most important points is that symptoms pointing to implications of the nervous systems are produced, although it has been in past times held that influenza is essentially manifested by a specific kind of inflammation of the respiratory and alimentary tracts almost exclusively, affecting sometimes in chief part either the one or the other of these, or at other times both either coincidently or consecutively. Now we know from repeated practical experience that we must include the nervous system as liable to be attacked quite as readily as either the respiratory or the digestive system. In fact, we must really look upon it as a general infection of the whole system, the blood no doubt being the medium of the distribution of the poison to all parts. However, it often appears to be the case that the one or the other of these two systems may be the primary seat of manifestation. In reality, then, we are considering a specific fever with well-known symptoms, now practically very familiar. As for the temperature, it may be high, and as a rule in all severe cases the mental collapse is so extreme that to the sufferer it may well seem that even death would be preferable to such misery as is experienced. Yet, although not only its origin from infection, but also its pathology, are extremely simple, the disease may well be termed a protean malady, since so many degrees of severity and so many apparently distinct forms does it assume. It is not, however, difficut to understand why this malady should affect in divers ways different people and the same person under dissimilar conditions. As a matter of fact, all diseases are liable to variations of type, as is well known: but this is more strikingly shown in the case of influenza, partly, perhaps, on account of its very wide and almost universal distribution, and principally, perhaps, because there is scarcely a part of the system which is not vulnerable to its virus.

The rashes of influenza cases are confusing and apt to mislead; and I have seen a girl with a rash like that typhus fever where there was probably nothing but a very bad attack of influenza. However, no importance can be attached to one such rash. On the other hand, cases repeatedly arise where we have little more serious to deal with than the simple coryza which undoubtedly may arise from a chill or benign cold. Probably such mild influenzas might, after all, be caused by an attenuated virus, for no doubt such germs are practically omnipresent in the air to a greater or less extent—at any rate, during epidemics. Similarly one may mention the two kinds of chancres, benign and malignant, the two kinds of psoriasis, the two kinds of diphtheritic throats, perhaps similarly related.

Horses, and probably most other animals, including cats, which probably often serve as channels of infection, are liable to attack. It seems to be without doubt carried through the air, and probably by the prevailing winds for long distances. Its progress is irresistible, and there is no known method of escaping from the infection. That the malady can be wafted over seas, oceans, and lakes seems at least probable, for many cases are known of sailors far away from land being affected. Unless the period of incubation be a very long one—a supposition we do not like to admit without very good proofs—we have no other very likely explanation of such examples, except, indeed, the possibility of clothes carrying the germs of the disease, and then a chill or exposure to cold rendering the object of attack vulnerable. To this we prefer the air-borne theory of transmission. We all recollect how, although we were well prepared by the newspapers for its expected appearance amongst us, many of us did not at first recognise the early indications of its presence in our midst. Very soon, however, as case followed case, it was very clear that we had to deal with a specific disease more important than the perennial

epidemics of ordinary colds. This fever, which was ravaging the whole country, manifestly presented some peculiar and hitherto unfamiliar features. A very large number of cases, presenting all degrees of severity, came under the treatment of every practitioner, and we soon learned to recognise the cases at once, and their correct management and treatment was simple enough, the only difficulty being that the medical man himself was sure to be affected sooner or later, and it is no exaggeration to say that most of us were nearly worked to death, and not a few actually died in consequence of carrying on work when incapacitated.

It has often passed current as true that a low state of the general health made one more liable to attack. This is a statement which, however probable it may appear to be as an *a priori* assumption is not consistent with facts. It is, in short, an inference for which there is no foundation. Indeed, the healthier one may be, the more likely he will be, if exposed to a sufficient degree of infection, to fall down a victim. The strongest and most robust agricultural labourers, living a healthy and regular life, were readily affected, especially, perhaps, in cold and wet weather. One attack, so far from conferring immunity, seems to render an individual more prone to subsequent infection, provided a short interval has elapsed. In other words, any immunity which there may be is of the most transient nature. There are very few people who have not suffered from influenza, and even many of these may have really had it in a mild form without its true nature being recognised, or, if not, they may look upon it as a probable treat in store. Most persons have had it more than once, whilst many have repeatedly been afflicted, some, like myself, so frequently that they have lost count of the exact number of times. All those who are liable to be brought into relation with patients suffering from this malady should exercise the greatest care, not only to prevent themselves getting the disease, but also to carry out such measures as would be likely to destroy the germs before they really gained a hold over the system, and thus cut short the infection. One of the very worst attacks I have personally had arose as a result of a professional visit to a very bad case. At this time, having recently returned from a short holiday, and being in very good health (so that it seemed almost impossible to catch cold), the only precaution I took was washing carefully and smoking. These measures were not sufficient. It has been held that the period of incubation varies from a few hours to even as long as three weeks. In all probability it is usually only a few hours, and seldom or never more than a day or two. Any evidence of a more prolonged period is vitiated by the fact that it is impossible in nearly all cases to exclude the idea of another source of infection.

It is also said that the invasion may either be gradual or sudden; but in most cases influenza is rather abrupt both in its onset and in its subsidence. A not uncommon first sign of attack appears to be an itchiness and smarting of the eyes and eyelids. The patient feels inclined, in consequence of this uneasiness, to rub the eyes. This itching is apparently caused by a catarrh of the conjunctivæ and is soon accompanied by a copious watering of the eyes. The catarrh very quickly extends to the nose and spreads rapidly downwards, the nasal cavities feel hot and dry, and soon a watery, acrid discharge flows profusely, causing repeated sneezing, and frequently a very uneasy feeling of stoppage and obstruction in the nasal cavities (coryza). Then there are chills or rigors and great misery, lassitude, and prostration, and not uncommonly a feeling of impending death. There is, as a rule, an intense and most painful headache, generally frontal, and perhaps due in part, but not entirely, to congestion of the membrane lining the frontal sinuses. The aching is not always confined to the frontal region. Any part, or, indeed, the whole head, may ache. There is nearly always a feeling of nausea, often actually vomiting,

which may be most violent and uncontrollable (comparable even to the violent vomiting which may usher in an attack of small-pox or other specific fever). Pains in the body and limbs may supervene, either very shortly or perhaps the next day. The patient often complains of aching all over, and so great is his misery that he may even long for death to end his sufferings. As for the temperature, it may be normal or only elevated a little, perhaps about one degree or a little more, or it may rise more or less rapidly as high as 104° or 105°F. The skin may either be hot and dry or it may be moist and bedewed with a sour perspiration. The urine may be, after standing, cloudy with deposit of urates, and frequently it is very bad indeed in this respect, being like very muddy water; the sneezing may soon cease or may continue for a day; the power of smell and of taste is impaired; there is a sense of severe dejection, and very likely a very profuse discharge from the nostrils, which may be so copious as at times almost to occlude the nares, and no doubt this excretion augments the headache. Soon sore throat (mouth, tongue, pharynx, and trachea) and hoarseness come on. At first the throat may be dry, but soon there is expectoration, which extends until bronchitis supervenes. Looking at the back of the mouth one is struck with the intense redness, due to engorgement of the small blood-vessels. This colour is generally demarcated rather sharply just in front of the pillars of the fauces, and forms a striking contrast to the appearance of the tongue, which may be whitish or yellowish white or of a nasty virulent yellowish hue, generally with thick, sticky, moist fur, not like that of ordinary torpidity of the liver, but something almost characteristic and to some extent even diagnostic. Sometimes the tongue is more like that of scarlet fever, being dotted with numerous white spots. Again, in other cases the tongue may be quite clear. This appearance is coupled with a feeling as if the throat had been powerfully scarified with a blunt and rusty knife or old saw. This feeling, though imperceptible in its growth, is worst at an early time of the disease, during the engorging of the blood-vessels and before the redness is best shown. In other words, when the congestion has really occurred the feeling is not so bad. There may be pain along the Eustachian tube, coupled with some deafness. About the lips there is often a herpetic eruption, and a rash often appears on the cheeks, neck, and chest. As a rule the patient is thirsty and has no appetite for food. There is nearly always great prostration and helplessness. At first there may even be inability to get into bed, or at least difficulty in doing so, and, in addition, severe physical discomfort may be experienced. One feels inclined to lie down in sheer exhaustion after the restlessness of the febrile stage has passed, and, as above said, even death may seem to be imminent and desirable to the sufferer. There may or may not be a feeling of oppression across the chest, and severe aching and shooting pains in the head, neck, chest, back, limbs, and abdomen are not unusual. Coupled with the epigastric pain and tenderness (from which the title "la grippe" derived its applicability) there may be nausea and vomiting, and perhaps diarrhœa or constipation. Giddiness and restlessness may be present. It is not an uncommon occurrence in severe cases for the sufferer to be suddenly struck down helpless, thus presenting a great similarity to the effects of an apoplectic stroke. A case of pure influenza, very much like one of cerebral apoplexy, was that of a woman of mature age, who was attacked with the disease whilst walking in the street homewards. She had been taken into an inn, and was lying quite helpless on the sofa when I arrived, and was almost unconscious and not able to satisfactorily reply to questions. After partially coming to this patient had to be sent home in a cab. This was really nothing more than a sharp seizure of the disease under consideration, yet there was in all probability meningitis and cerebral congestion in this as in several similar cases. It was not only in persons of mature age, nor in the weak, infirm and

unhealthy, nor was it in the intellectual classes that these marked nervous phenomena generally occurred. Another instance was a strong young man, who, when I arrived, was similarly prostrate, dazed, and helpless, with the tongue very markedly furred with a nasty yellow covering. He had to be practically carried upstairs to bed, as he had lost nearly all power of movement. Delirium, stupor, and convulsions may occur, and stupor is often shown. In one case, or I may say in two, though I have some doubts as to the exact causation in one of these, continued drowsiness, and, indeed, actual sleep occurred for the best part of three and half days. There was in the case which I am clear was one of influenza no danger whatever; but this sleep was uncontrollable, and, indeed, seemed necessary for recovery. These were both young girls. The one about whom I am certain is now married, and I saw her a short time ago, and referred to this influenza sleep which occurred some few years ago. It was a peculiar case, and the sleeping was perfectly genuie. With regard to the pulse, it is as a rule frequent, full, and bounding but it generally soon becomes soft, weak and slower.

With regard to prognosis, very early or advanced age, or chronic pulmonary or cardiac disease, and especially, perhaps, nervous complications, render the disease grave. It is very questionable if it is scientific or even wise to make a classification of varieties; but, speaking quite generally and from ordinary practical experience, we may mention four chief types: (1) pulmonic; (2) abdominal; (3) neurotic; and (4) rheumatic. The only or chief merit of this classification is its usefulness. Often a case is met with which does not belong to any of these classes in particular, but presents symptoms of all four types. There is also a malignant form of influenza which may be called typhoid, and, indeed, it is sometimes very difficult indeed to distinguish it from true typhoid fever, especially if the latter begin, as it often does, with a pneumonia. Sometimes, in order to be on the safe side, it seems best to treat such doubtful cases as if they were really typhoid fever in regard to the wisdom of abstention from solids. So puzzling in practice are some of the cases that the question may arise: Is it just possible that there may be some connection between typhoid fever and typhoid influenza, that the germs of the one disease may be a modified variety of the other? On the whole, it is perhaps wisest to recognise the diseases as distinct.

Perhaps the most characteristic feature of influenza is the intense nervous prostration and feeling of utter helplessness and misery it causes. In most cases presenting any serious symptoms it is quite unnecessary to tell the patients to go to bed, for frequently they can not only not stand, but not even sit down with comfort. In some the prostration is excessive, as it was in a woman under my care who remained in bed for about ten days with an average temperature of 102·5° F., scarcely able to take anything except effervescent or lemon drink and barley water, unable to sleep without the aid of sulphonal or bromides or other sedatives, vomiting and purging persistently whenever any food was taken, and constantly racked with headache and pains in the limbs.

In regard to the important matter of treatment, it may be said to be unwise to adhere to any fixed line. Some authorities condemn the system of treating symptoms; but in reference to influenza special regard must be paid to them. It is above all things necessary to watch the case well and alter the remedies used directly there is need for so doing. On constant watchfulness and care depend our hope of best success. The presence of uric acid in the system should be combated with alkalies. The bowels must be opened daily and diarrhœa checked; vomiting also should be arrested. Where there are lung symptoms, poulticing the chest should be judiciously carried out, and when there is much abdominal pain this is also a very useful measure. Hot flannels with ur pentine or some special embrocation, or warm anodyne fomentations, may

be substituted. The dieting and general hygienic management are of importance, and at first all solid food should be rigidly prohibited. Antefebrin, phenacetin, citrate of caffein, and gelsemium in small doses are invaluable, when properly used, to arrest the headache. Salicylates, coupled with salts of ammonium and bicarbonates of the alkalies, mingled when necessary with the best cough mixtures, in order to allay the soreness of the throat and the distressing cough, may be advised, with due regard to all the circumstances of the particular case under consideration. Stimulants, such as brandy, whisky, port wine, etc., may be prescribed with care, especially to the old or feeble. Quinine cannot be recommended until the stage of convalescence is reached. The air in the room should be kept pure, if necessary by opening the windows, taking care to avoid draughts. It is also well to have disinfectants about, and it may even be advisable to burn a little sulphur or disengage some sulphur dioxide by other means. The patient may inhale a little iodine from time to time or ammonia from a bottle containing either of these substances. Creosote or eucalyptus or carbolic steam may be preferred, or steam with ether, chloroform, or conium. The patient should keep to bed so long as there be any serious symptoms. With absolute rest in the recumbent posture and fluid diet recovery will be quicker. In adults, a dose of calomel is often advisable. The food at first should consist of beef-tea and milk with cold, or iced, or effervescent fluids. Soon the diet may be extended; should capillary bronchitis or symptoms of pneumonia appear, decoctions of bark and chloric ether with camphor and ipecacuanha, and some of the usual syrups, as well as stimulants, may be useful. If the pains are severe in the limbs, a larger dose of bicarbonate of potassium may be coupled with some opium, and also with iodide of potassium and salicylate of sodium, or a mixture of bromides may be serviceable. If the temperature be high, sponging with cold or tepid water is very valuable, or with a solution of permanganate of potassium. If the headache be severe, cold applications of vinegar cloths may be placed on the painful part, and in some cases two or three leeches are very effectual; indeed, sometimes even one leech acts like a magic charm. During convalescence, tonics, *e.g.*, gentian, iron, or quinine, or syrup of the hypophosphites, with good food and wine, are advisable. Should there be much debility left after recovery it is wise to order a complete change if it be possible.

Most patients, however, make a very good recovery, and it is generally only those who have not been properly attended to, taking, perhaps, no medicine at all, or only such household remedies as are in general use, or, perhaps, other equally inefficacious nostrums, who are troubled with those interminable complaints which are often traced to the time "when I had the influenza."

TUBERCULOSIS.

BY D. MCEACHRAN, F.R.C.V.S., CHIEF VETERINARY INSPECTOR FOR CANADA.

In issuing this bulletin on a subject affecting very intimately not only the extensive and rapidly-growing cattle industries of Canada, but also having a close and direct bearing on the health and lives of the people, an effort is being made to convey to everyone interested, more especially the farmers, dairymen, and stock-raisers, in a condensed form and in non-technical language, a simple statement of facts as to the nature, causes, symptoms, and prevention of this disease.

In the preparation of the bulletin free use has been made of the publications and reports of the best authorities up to date, especially those of Professor

E. Nocard, of Alford Veterinary College, France, Chief Consulting Veterinarian in France; Professor Bang, of Denmark, who was specially employed by the Danish Government to investigate this disease; the report of the Royal Commission appointed by the British Government; the reports of the Bureau of Animal Industries at Washington, U.S.A.; Professor Theobold Smith, Harvard University; Professors Law and V. A. Moore, Cornell University, etc., as well as of the extensive experience of the veterinary staff of the department.

The statements contained herein are accepted generally by scientific men as facts, and our farmers may accept them as such, care having been taken to avoid making statements on debatable points. The Minister trusts that interested parties will carefully read the bulletin, preserve it for future reference, and apply the suggestions contained therein to their own individual cases.

Full directions for applying the tuberculin test are given, by following which any intelligent person accustomed to handle cattle may diagnose obscure or latent cases, which seldom present symptoms recognizable by mere clinical examination.

Accuracy in conducting the test being all-important, any owner desiring to have his cattle tested by a Government Inspector may have it done free of cost by making application to the Department of Agriculture at Ottawa by a letter addressed to the Deputy Minister of Agriculture. This does not apply, however, to the testing of cattle for exportation to the United States.

In the event of an Inspector discovering the disease in one or more of the herd, it will be his duty to at once remove them out of the byre to an isolated place, in which they must remain quarantined until otherwise disposed of. The premises must also be disinfected to the satisfaction of the Inspector.

Indemnity.

As no provision has so far been made by Parliament for the payment of indemnity for animals slaughtered on account of this disease, under ordinary circumstances no indemnity will be paid by the Minister of Agriculture.

Obligations of Owners of Diseased Cattle.

The following extract from the Animals Contagious Diseases Act will explain to owners of diseased cattle their responsibility under this Act:—

3. Every cattle or farm stock owner, and every breeder of or dealer in cattle or other animals, and everyone bringing foreign animals into Canada, shall, on perceiving the appearance of infectious or contagious disease among the cattle or other animals owned by him or under his special care, give immediate notice to the Minister of Agriculture, at Ottawa, of the facts discovered by him as aforesaid.

4. Every owner of such diseased cattle or other animals who neglects to comply with the provisions of the next preceding section shall forfeit his claim to compensation for any cattle or other animals slaughtered in accordance with the provisions of this Act; and no such compensation shall be granted him; and every person who maliciously or fraudulently conceals the existence of infectious or contagious disease among cattle or other animals shall incur a penalty not exceeding two hundred dollars. 48-49 V., c. 70, s. 4.

5. Every person who turns out, keeps, or grazes any animal, knowing such animal to be infected with, or labouring under, any infectious or contagious disease, or to have been exposed to infection or contagion in or upon any forest, wood, plain, moor, beach, marsh, common, waste land, open field, roadside, or other undivided or unenclosed land, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 48-49 V., c. 70, s. 5.

6. Every person who brings, or attempts to bring, into any market, fair, or other place, any animal known by him to be infected with, or labouring under, any infectious or con-

tagious disease, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 48-49 V., c. 70, s. 6.

7. Every person who sells or disposes of, or puts off, or offers, or exposes for sale, or attempts to dispose of, or put off, any animal known by him to be infected with, or labouring under, any infectious or contagious disease, or the meat, skin, hide, horns, hoofs, or other parts of an animal known by him to be infected with, or labouring under, any infectious or contagious disease at the time of its death, whether such person is the owner of such animal, or of such meat, skin, hide, horns, hoofs, or other parts of such an animal or not, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 48-49 V., c. 70, s. 7.

8. Every person who throws or places, or causes or suffers to be thrown or placed, into or in any river, stream, canal, navigable or other water, or into or in the sea, within ten miles of the shore, the carcass of an animal which had died of disease, or which had been slaughtered as diseased or suspected of disease, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 48-49 V., c. 70, s. 8.

9. Every person who, without lawful authority or excuse, digs up or causes or allows to be dug up the buried carcass of an animal which has died or is suspected of having died from infectious or contagious disease, or which has been slaughtered as diseased or as suspected of disease, shall, for every such offence, incur a penalty not exceeding one hundred dollars. 48-49 V., c. 70, s. 9.

10. If any animal affected with or labouring under any infectious or contagious disease, is sold, disposed of, or put off, or is exposed or offered for sale in any place whatsoever, or is brought or attempted to be brought for the purpose of being exposed or offered for sale in any market, fair, or other open or public place where other animals are commonly exposed for sale, any clerk or inspector, or other officer of such fair or market, or any constable or policeman, or any other person authorized by the mayor or reeve, or by any justice of the peace having jurisdiction in the place, or any person authorised or appointed by the Governor in Council, may seize the same, and report the seizure to the mayor or reeve, or to any justice of the peace having jurisdiction in the place; and such mayor, reeve or justice, or person authorised or appointed by the Governor in Council, may cause the same, together with any pens, hurdles, troughs, litter, hay, straw, or other articles which he judges likely to have been infected thereby, to be forthwith destroyed, or otherwise disposed of, in such manner as he deems proper, or as is directed, as provided by this Act. 48-49 V., c. 70, s. 10.

Tuberculosis.

This disease claims for its victims nearly, perhaps we might say, all the domestic animals, and few of the wild animals subjected to domestication resist the contagion, as is well known to keepers of menageries. Rats, mice, and other vermin which inhabit houses and outbuildings not only contract the disease but are active agents in spreading it.

Some species are more susceptible than others and contract it readily by eating food containing the germ of the disease, or inhaling the dried germs given off from the lungs and throats of animals affected in these organs.

The most susceptible of the domestic animals are cattle, swine, chickens, goats and rabbits. These contract it readily in the natural way, but it can be produced in sheep, dogs, cats and horses by inoculation with tuberculous material.

Tuberculosis in the lower animals is identical with consumption in the human family. It is due to the same germ (bacillus tuberculosis).

It is communicable from other animals to man, and just as readily from man to the lower animals, by natural infection and by inoculation.

Tubercle.

The germs (bacilli), which are living organisms of minute microscopic size, when they reach and become located in a tissue, produce local irritation and the formation of small reddened areas infiltrated with fluid and cells. These are the tubercles. As they become a little older they enlarge, and their colour is greyish or yellow from changes that take place within causing the

death of the central tissues. Their appearance and consistence in this way resemble that of cheese.

These nodules may vary in size from a pin head to a cocoanut; often they are of stony hardness from the presence of lime salts. The tubercles may be confined to one organ or tissue of the body, such as the lymphatic gland, for example, of the mesentery or thorax, or the throat, or udder, or ovaries, etc., or they may be generalised throughout the body, the germs travelling in the blood circulation. In this way the abdominal organs (liver, spleen, kidneys, etc.) may all be involved, as well as those of the thorax, lungs, pleura, heart, lymph-glands, etc. Often the pleura and peritoneum are covered with grape-like excrescences whose appearances are characteristic of this disease. Whenever tubercles are lodged for any length of time, much destruction occurs in the affected tissue.

The Tubercle Bacillus

Is described as a rod-shaped organism with rounded ends and a slight curve, requiring complex laboratory methods of cultivation and staining to prepare it for microscopic study.

It is a parasitic organism, which is only found in the bodies and excretions of animals affected by this disease. It thrives badly in the sunlight, which is said to kill it in from a few minutes to several hours. This fact should be remembered in dealing with it with a view to preventing it.

The invasion of the animal's body by the entrance into it of living bacilli is effected either through the digestive organs (ingestion), or by the respiratory organs (inhalation), by transmission to the sexual organs when the testicle is invaded, and by inoculation, or by a cut or abraded surface.

Without the entrance of the living bacillus into the body, tuberculosis cannot affect it. It is the seed from which it grows and it is as essential to the development of the disease as oats, peas, or potatoes are to reproduce these plants.

What renders Cattle susceptible to this Disease?

Impaired health from whatever cause it arises renders cattle susceptible to tuberculosis. Heredity has been proved not to be an active cause of its propagation, it is, however, a predisposing one, and while it is well established by the experiments of Professor Bang and others that calves may be bred from tuberculous mothers, and if removed before the cow licks them, or they have sucked their mother's milk, are placed in absolutely healthy surroundings and fed on milk from healthy cows, they can be reared and remain so far as any inherited disease is concerned perfectly free; but common sense will teach us that in such animals we are likely to find a predisposition, that is a condition favourable to the growth and development of the tubercular bacillus, animals likely to contract the disease when exposed to contagion which their neighbours not so predisposed would resist successfully.

In-and-inbreeding is another predisposing cause, by producing animals with reduced vitality. Over-milking, under-feeding, want of sunlight and pure air, insufficient exercise, breeding too young, are all what may be termed predisposing causes to turberculosis, and should be avoided.

One breed of cattle is just as subject to this disease as another when subjected to the predisposing and exciting causes. Dairy cattle are most subject to it because they are most exposed, they are more congregated, more closely and continuously housed, their vitality more drained by heavy milking, and they are kept longer. Their calves are more liable to milk infection, as they are fed on mixed milk, whereas the beef breeds usually suckle their calves. The majority of beef cattle are killed off at three or four years old

hence they are exposed to the contagion for a shorter term of life, which is spent more in the open-air and in sunlight.

How the Disease is Usually Introduced into a Herd and How it Extends in it.

A tuberculous bull is probably the most active agent in spreading this disease, both by cohabitation and sexual connection.

Farmers cannot be over cautious in buying a bull or in having cows served by one till he has been subjected to the tuberculin test and found free from the disease.

Nothing should induce a breeder to allow contact with his healthy cattle by a bull till he has every assurance that he is free from tuberculosis.

Tuberculous animals of any kind should be prevented from coming in contact with the cattle.

Tuberculous Attendants.

Tuberculous attendants: men or women suffering from pulmonary consumption should on no account be allowed to feed, milk, or have anything to do with cattle or pigs.

The intercommunicability of the disease from animals to man, and from man to animals is an established fact no longer open to discussion.

The bacilli from the throats and lungs of diseased people or animals, being coughed up, adhere to and dry on the woodwork, walls, floors, and feed-boxes in buildings, cattle-trucks and stockyards, and the dust being moved about by air-currents. or, mixing with the food in the hay-rack or feed-trough, find access to the stomach and intestines, thence through the blood or lymph-channels to the abdominal glands and other organs.

Danger from Milk.

The virulence of milk from tuberculous cattle especially when the udder is diseased has been clearly demonstrated. Milk is dangerous even when the udder is not specially diseased, It will communicate the disease even when diluted by mixing with large quantities of other milk in the creamery or cheese factory; whey is equally dangerous.

The germs remain active in the skim-milk and whey, and may produce the disease in calves fed on it. Milk obtained from creameries in districts where tuberculosis prevails should be raised in temperature for 10 minutes to 160° before being given to calves, otherwise living bacilli may be taken into the stomach, and entering the lymph channels produce the disease. As a precautionary measure, milk from tuberculous cows should not be received at creameries or cheese factories. All skim milk and whey should be heated to 160° for ten minutes before being given out to farmers from the factories for feeding calves or swine. Unless this is done creameries and cheese factories may become distributing agents of the disease to healthy herds. Milk from tuberculous cows is a frequent source of communicating the disease from cattle to people, especially children and old feeble persons; meat from diseased cattle is also dangerous, although it may be sterilised by heat.

How to Prevent its Introduction to a Herd.

See that your animals to begin with are free from the disease.

Never bring any animal into the byre till you have ascertained beyond a doubt that it is healthy.

Keep your own bull. Your neighbour may be obliging, but if careless

about the health of his stock, you may suffer irreparable injury by accepting even the free use of his bull should the animal happen to be tuberculous.

Conversely, if you have a bull, be exceedingly careful to see that no tuberculous cows are brought to him for service.

Never allow a consumptive person to have anything to do with your cattle; make no mistake about this.

Your byres must be well lighted, almost as light as outdoors; disease germs are killed by sunlight.

Pure air and plenty of it is essential to health. This can only be provided by sufficient space. Let your cow-stable be roomy.

Drainage is essential to purity of the air. Without proper and efficient drainage the air must become contaminated by emanations from the droppings and urine of the cattle as well as by the decomposing vegetable matters with which they are mixed.

Drain your buildings, and do it thoroughly.

The ventilation is all-important. By properly arranged ventilators the impure air is removed and replaced by pure, the oxygen of the air is constantly being consumed in the process of breathing, and unless it is replaced it becomes unfit to sustain animal life. The constant change of the air in buildings inhabited by animals is absolutely necessary to preserve health.

During summer weather most buildings are sufficiently ventilated by the doors and windows being left open; it is during the winter, when cattle are housed, that they suffer from imperfect ventilation.

Proper ventilation provides for the admission of the pure, and the escape of the foul, air. As a rule farmer's architects do not make sufficient provision for either.

The air may be admitted by openings near the floor, and by windows hinged at the bottom, and dropping inward.

The ventilators or air-shafts are usually too small. Most buildings require shafts three feet square, placed about twenty feet apart, in the middle aisle of the byre. The shafts should be divided inside into two by a partition extending from the top to within three feet of the ceiling; the opening being controlled by trap-doors opened or closed by cords running through pulleys.

Cattle standing head to head objectionable.

The common plan of arranging the byre, so as to save labour in feeding, by having an alley-way with the heads of the cattle opposite each other is objectionable from a health standpoint, as it exposes animals opposite tuberculous cattle much more to the contagion than when they are placed with their heads to the wall. They may be easier fed the former way, but they are easier cleaned the latter, and it has a decided sanitary advantage should contagious disease exist.

Running water in troughs placed in front of the cattle is objectionable if tuberculosis is present, as by this means the germs may be carried in front of the whole herd.

Symptoms and Diagnosis of Tuberculosis.

In the majority of cases the symptoms are obscure, and till the discovery by Professor Koch of the reaction produced by the injection of tuberculin (being a most reliable test for discovering this disease in obscure cases unrecognisable by symptoms) the majority of cases could not be detected even by experts.

When affecting the lungs, throat, and respiratory organs generally, it is accompanied by a frequent cough but no fever. There is disturbance of respiration; the breathing is quickened by slight exertion or excitement; the cough is produced by changes of temperature. The expert can detect dull

spots surrounded by areas of increased resonance on examination of the lungs by the usual methods.

Usually the superficial glands, in the throat, between the jaws, under the ear, or the udder, may be hard and swollen. The animals may continue for months or even years to maintain fair condition. They are sometimes fat while the lungs may be found studded by large tubercular masses.

When the disease is abdominal and the glands and organs in the belly are chiefly affected, the symptoms of defective nutrition are early apparent; emaciation, lessened secretion of milk, indigestion, breathlessness, and general failure more or less rapid. Many cases cannot be detected by symptoms, but can be almost to a certainty (in 98 per cent. at least) by the tuberculin test.

The Tuberculin Test.

Until the discovery by Professor Koch, in his experiments to discover a cure for consumption in human beings, that the injection of tuberculin invariably caused a rise in temperature when the person or animal was tuberculous; while it produced no effect whatever when free from it, the detection of the disease in early stages or when slightly affected was considered impossible in most cases. This test is most delicate and reliable (about 98 per cent.) where it is properly applied.

Tuberculin is a soluble product of cultures of tubercle bacilli, of which a glycerine extract is made, which is sterilized by heat, and filtered through porcelain, so that it contains no living germs, and, therefore, cannot produce tuberculosis in animals injected with it. It has, therefore, no effect on healthy animals; in some cases the disease is aggravated by it when it exists, but it cannot be produced by it. The lymph must not be exposed to sunlight; it must not be frozen; must be kept well corked to exclude air.

Tuberculin injection has no bad effects on the secretion of milk.—The concensus of opinion of those most experienced is that it does not lessen the secretion of milk in dairy cattle, consequently they may be tested even when in full milk without disturbing its secretion.

Dose.—The dose varies with the size and age. As issued by this department it is ready for use, with doses marked on the bottle, viz., 20 drops for calves, 40 for small or medium-sized animals, 60, larger, and 80 drops for very large ones.

When second tests are considered necessary at least 30 days should elapse, and the doses be slightly increased.

Preparations for the Test.

It being decided to test a herd, the following suggestions should be considered. If the weather is extremely hot or very cold, wait till it moderates. If the animal is suffering from any inflammatory disease when the temperature is over 102° from any cause, a cow being bulling—a bull being sexually excited, scarcity of water, impure air, irritation from flies, pregnancy in advanced stages, are all unfavourable for reliable testing.

Instruments necessary.—The following instruments are required. One or more Fahrenheit (clinical) thermometers, a hypodermic syringe, with three strong hypodermic needles, and a fine trocar and canula, a fine brad-awl, and a pair of clippers or curved scissors, and several glass droppers.

The Thermometers in use for this purpose cost about one dollar, are self-registering, and can be bought at any drug store.

Syringes.—Metallic syringes, strong and easily taken apart to be cleaned and disinfected, costing three dollars, can also be obtained at drug stores, or instrument makers.

The Scissors and Brad-awl are easily and cheaply procured at any hardware store.

Charts for recording tests which should be numbered, and the name or number of the animal, the colour and markings, sex, age, breed, hours at which the temperatures were taken before and after injection, and a column for the decision should be arranged.

Disinfectants.—Professional men generally prefer a solution of corrosive sublimate, 1 part to 1,000 of water, but equal results will be obtained by using a 5 per cent. solution of carbolic acid or creolin, and they have the advantage of being less poisonous. Such a solution is required to wash the hands and instruments in, and when used to disinfect the skin it has the advantage of being anæsthetic locally.

The Cattle should be Stabled.—If the cattle are at pasture, they should be stabled, tied up in their accustomed stalls, numbered as they stand, handled quietly, by those accustomed to feed and milk them.

They should be allowed to remain undisturbed for some hours, being careful not to disturb the temperature by large draughts of cold water or overabundant feeding.

Taking the Temperature before Injection.—Two men to whom the cattle are accustomed should assist the person taking the temperature. One takes the nostril with finger and thumb with one hand, and the horn with the other. The second stands at the hip to prevent her moving from side to side. The thermometer with the mercury forced down by a few sudden jerks, as if shaking ink off a pen, till it marks below 100°, is inserted into the rectum, where it should remain for three minutes. Enter the temperature in a book or chart every three hours, commencing at 8 a.m., 11 a.m., 2 p.m., 5 p.m., and 8 p.m.

The hands and thermometer should be dipped in the disinfectant solution before inserting it into another animal. When there is a large number to be tested three thermometers may be in use simultaneously, so as to save time.

The best place to inject the test is in the loose skin on the side of the chest above and behind the elbow. The hair should be closely clipped of in a circle about three inches in diameter, and the skin well washed with a 5 per cent. solution of carbolic acid.

Injecting the Test.—The dose of diluted tuberculin is now taken into the syringe, all air being forced out. The operator, if he is a fairly tall man, and the animal not very large, should stand on the oppsite side, and reaching across the shoulder, he takes up the disinfected loose skin with the fingers, and if the needle is strong and sharp enough, he penetrates it and pushes the needle its full length into the loose cellular tissue beneath the skin ; if not, he should with the brad-awl pierce the skin and insert the needle into the puncture, then slowly inject the fluid, withdrawing the needle gradually. The advantage of this position is that the animal, when pricked with the needle, cringes from it, and needles are often broken, whereas in this position it cringes towards instead of from the operator.

The Best Time to Inject the Test.—The injection may be commenced after finishing taking the normal temperatures, say, nine o'clock in the evening.

Temperatures After Injection.—Commence to take the temperature at 6 o'clock next morning, take them every three hours till it falls to normal again. If tubercle is present there will be a rise of temperature, which attains its highest point usually about mid-day, sometimes later, and generally it falls gradually, till in about twenty-four hours from the hour of injection, it is normal again.

The rise in temperature is no indication of the extent of the disease. Often the reaction is a high temperature, and *post-mortem* examination shows but slight affection.

Sample of Chart.

CHART NO.....

Tuberculin Test at..... of Cattle owner by Mr. .....

No.	Age—Years.	Sex.	Breed.	Colour.	Date.....189				Date 189						Normal.	Reaction.
					TEMPERATURE.											
					BEFORE INJECTION.				AFTER INJECTION.							
					8 a.m	11 a.m	2 p.m	5 p.m	8 p.m	6 a.m	9 a.m	12 a.m	3 p.m	6 p.m	9 p.m	Maximum.
*1	5	Cow	Ayrshire ..	Red and white	101	101⅜	102	101⅝	101⅝	101⅝	101½	100	100½	102	102	102
†2	8	,,	Shorthorn ..	Roan ..	.. 101½	101⅝	101⅜	101⅝	101⅝	103⅜	106	107	106⅝	105½	104⅝	101⅜	107

Often no Reaction in advanced Cases.

It is usually found that in animals in advanced stages of the disease, owing to there being a superabundance of tuberculin in the system already, there is little or no reaction.

Fortunately in such cases the symptoms are so apparent, such as coughing, wasting, enlarged glands, etc., that the owner has little difficulty in recognising the disease.

How to deat with a Diseased Herd.

When tuberculosis is discovered in a herd immediately remove the diseased ones from the healthy to another isolated stable, or a part of the byre may be partitioned off by close boards as far as possible from the rest of the herd.

In the case of low-priced cattle the owner will best serve his own interests by slaughtering them at once.

When they are specially valuable and in calf, the experiments of Professor Bang and others show that the calf may be saved by removing it as soon as born, and before the cow has licked it, or it has been suckled by its diseased mother, and by placing it in an uninfected building, and feeding it on milk from tested cows, it will in all probability grow up free from tuberculosis, although, as previously explained, it may have a predisposition to contract the disease.

The herd should be tested every six months, and those which react likewise removed, till all trace of it disappears.

Disinfection of Premises.

Most careful and complete disinfection of infected buildings and yards in which diseased cattle have been kept should be employed to rid them of disease germs.

In doing this before sweeping sprinkle the floors and walls well with water to prevent dust rising, remove drinking troughs, feed boxes, and stall divisions. The floors must be specially scrubbed, the walls, ceilings, and partitions should be carefully washed, and all freely sprayed with a disinfectant solution such as carbolic acid, one pint of crude acid to four gallons of water or better still, lime wash. It may be applied by a whitewash brush or a spraying pump, care being taken to see that every corner, crack, and joint is thoroughly penetrated by it.

The cleansing and disinfection should extend to drinking troughs and fences of the barn yard to make disinfection complete.

Decision—* Healthy. † Tuberculous.

Disposal of Tuberculous Carcasses.

All animals slaughtered should be buried or burned. It is allowed in densely populated European centres by Government regulation that when the disease is limited and local the flesh may be sold for food, all others are confiscated and destroyed.

In Canada no provision is made in the Animal Contagious Diseases Act for such disposal; on the contrary it is strictly forbidden under section 7, 48-49 V., c. 70, which is as follows:—

7. Every person who sells or disposes of, or puts off, or offers or exposes for sale, or attempts to dispose of or put off any animal known by him to be infected with or labouring under any infectious or contagious disease, or the meat, skin, hide, horns, hoofs, or other parts of an animal known by him to be infected with or labouring under any infectious or contagious disease at the time of his death, whether such person is the owner of such animal, or of such meat, skin, hide, horns, hoofs, or other parts of such an animal, or not, shall for every such offence incur a penalty not exceeding two hundred dollars. 48-49 V., c. 70, s. 7.

Every stock-owner should have his stock tested, and voluntarily eradicate the disease from it, because diseased animals are a constant source of danger to the balance of the herd. It is unlawful to sell animals or their products known to be suffering from a contagious disease as tuberculosis is well known to be. Buyers of breeding stock will not purchase from a herd suspected of disease.

Tuberculous cattle cannot be exported. They are a menace to your neighbour's cattle, which may be infected by them; milk and other products of the dairy is dangerous to your own family as well as others using it when drawn from tuberculous cows. Once your herd and premises are free from the infection they can be kept so by following the suggestions above made. It is a duty you owe to yourself, your clients, and country.

By co-operation of the breeders it is quite within the possibilities that this disease can, in a few years, be eradicated from Canadian herds. If the nature and manner of introduction and extension of tuberculosis is once thoroughly known, and preventive measures are enforced in both the human family and lower animals, this fell destroyer of human beings and the lower animals will disappear from the Dominion.

EXPERIMENTAL AND CLINICAL STUDY OF THE ASPERGILLUS FUMIGATUS.

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BY A. LUCET.

(*Continued from page* 231.)

Experimental Mycosès (*continued*). *Pathological Anatomy.*

WHATEVER be their species the animals which succumb to inoculation of spores of the *Aspergillus fumigatus* show lesions whose aspect and distribution vary little. Assuming generally the form of whitish hard tubercles, whose limits are pretty well marked, and whose volume varies according to the organs affected and the rapidity of evolution of the experimental malady they settle, in order of frequency, in the kidneys and the liver, the spleen and the heart, the lungs, the muscular tissue, and the intestinal walls. They may also be met with in the periarticulary tissues, under the periosteum, and even in the encephalon and the marrow of the bones. The kidneys, which are always considerably affected in the rabbit, are hypertrophied, and their surface presents an irregular aspect, due to the presence of granulations, which take their rise beneath the serous membrane. Of a yellowish-white colour, projecting, often surrounded by a congestive zone, of a volume which varies

greatly, these granulations may reach the dimensions of a big pin-head, a lentil, or even bigger. On the level of these the renal capsule is swollen and infiltrated. Besides these superficial lesions there exist others more profound, and dissection of the organ shows its cortical portion riddled with whitish or yellowish-white nodules projecting slightly over the cut, well defined and surrounded by a more or less congested zone. Sometimes spherical, these nodules are in this case generally tapering in the direction of the renal tubes and converging towards the hilum. Such is the macroscopic aspect of the renal lesions, when they are well developed and mature. When younger they are not so large, not so circumscribed, more irregular, and assume a larvated appearance. Further, the congested zone which surrounds them is more extended and possesses characteristics which are more highly accentuated. The older they are, however, the more are they delimited, dense, resistant, and they are, as a rule, without an inflammatory areola. Microscopic examination of these tubercles shows that they, when young, consist of a mass of mycelian interlaced filaments, which take their rise in the glomerules or in the uriniferous tubes, and their branches stretch and radiate in every direction, even as far as to points whose histological appearance is as yet normal or scarcely changed at all. In the glomerules these filaments generally assume a radiating form which is sufficiently clear; but in the urinary tubes they are rather placed side by side, in a longitudinal direction, parallel to the direction of the organ in which they are situated. There they also shoot forth branches more or less numerous which often end in little tufts of short filaments emerging from the terminal extremity of the principal branch. Around this mycelium of the fungus there exists a good number of leucocytes mixed with the renal cells, which, swollen, turbid, and with their nuclei ill defined, are in process of degeneration. In fact, it is a peripheric congested zone, in which the capillaries are distended, and in which extravasated blood globules may sometimes be found. If the tubercles are older the mycelium, which has extended and penetrated to all the neighbouring parts, is less easy to see, masked as it is by the numerous leucocytes which come from the vessels by diapedesis and enclose it. At this stage the tubercles almost exclusively consist of white globules. Later on, the mycelium vanishes, and the lesion shows in its centre a tangled mass of leucocytary tissues in process of degeneration. Sometimes even the central portion is completely softened. If the animal in which these renal lesions have been studied is a subject which has got better after an insufficient inoculation, or for some other reason, the tubercles are replaced by whitish scars, often cup-shaped, which histological examination shows to be composed of a tissue of sclerosis mixed with embryonic elements and full-grown conjunctive elements. In these tubercles there generally remains no longer any appreciable trace of the fungus. Rénon, however, claims to have sometimes found in these cicatricial lesions some mycelian branches coloured by the thionine, and assuming there a form clearly radiative. Though frequent and important in the guinea-pig, the renal lesions are less constant in birds, with which they generally take the form of miliary tubercles. In these, however, as in the rabbit, the liver, much congested and considerably increased in size, is the seat of granulations whose number is such, in the case of inoculations rich in spores, that it is literally crammed with them. Never or rarely attaining to the size of those which occur in the kidneys, the greatest do not as a rule exceed the size of a grain of millet, and often they exist only under the form of microscopic tubercles. When the disease has been very rapidly fatal, they are shown by the microscope to consist of one or more spores, ending in a capillary or near toone, having germinated and put forth mycellc branches, in bushy or fan-shaped tufts, and surrounded by epitheloidic or leucocytic cells. A little later, when the mycelian filaments

have spread, necrosis attacks the cells of the liver which are closest at hand, and round them stretches a congestive and hœmorrhagic zone very distinctly marked. When the disease has matured more slowly, the tubercles are bigger and show in their centre a more abundant mycelium, whose branches, interlaced, close packed, sometimes very distinct, appear in other cases only on the periphery, disseminated and placed at regular intervals from one another in the middle of a great mass of embryonic cells which have attacked the centre of the tubercle, and hidden or destroyed the parasite. Often we meet with some of these mycelian branches isolated, in regions relatively healthy, and far from their point of origin. Around these leucocytary masses the nearest hepatic elements, in process of degeneration, are swollen and turbid, and have their nuclei ill-defined. In the guinea-pig, besides these lesions, there frequently existt marked injuries of the spleen, which are met with but rarely in other animals, or at least not so clearly developed. Hypertrophied, and having doubled or tripled in size, this organ, when impaired, is infiltrated by an enormous quantity of tubercles, greyish and miliary, or attaining to the size of a pinhead, and then whitish. Of the same nature as the tubercles of the kidneys and liver, the splenic granulations are essentially composed of mycelian filaments mixed with white globules in greater or less numbers according to the age of the lesions. Few in number and allowing the mycelium of the fungus to be seen, when the tubercles are young, they are numerous, closely packed one against the other, and allowing the mycelian branches to be seen only on the periphery in which they are disseminated and isolated, if the lesions are of more advanced age. From the special point of view taken by the *Aspergillus fumigatus* when it develops in the thick portions of the living tissues, the splenic lesions seemed to me the most interesting, for it is in them especially that I have found the radiative form very much accentuated, giving the parasite a vague resemblance to the actinomycosis. Beginning at a very distinct central point, the mycelian filaments, vigorous, large, and long, are clearly visible in it, even without special colouring, by reason of their special refractory power, and form a regular, radiative mass, whose central portion, on incision, shows round shiny bodies, which are nothing else than hyphi cut perpendicularly to their axis by the microtome. But this peculiar appearance assumed by the parasite in the splenic lesions of the intravenously inoculated guinea-pig is not constant. To obtain it, the subject must not die too fast—before four or five days, for example. Otherwise it does not exist. These splenic tubercles, then, like those of the kidneys, furnish, as regards rich growth of mycelium, very interesting preparations when they are treated with potash in the manner I have indicated. The heart, which is frequently attacked—in the rabbit, at any rate—when the malady is intense and the number of spores injected considerable, shows whitish nodules of variable size, but sometimes reaching exaggerated dimensions, which give them an irregular and knobby appearance. Taking their rise in either the surface of the myocardium or in its thickness, they ordinarily possess an elongated shape. Composed essentially, as are the tubercles before described, of a mycelium more or less plentiful and interlaced, and of epitheloidic or leucocytic cells surrounding and enclosing it, they cause in the points where they settle destruction of the myocardium, and in their neighbourhood a parenchymatous myocarditis, accentuated by the degeneration of the muscular fibres. The experimental mycoses, it has been seen, cause but rarely pulmonary lesions, whatever be the species of the animal inoculated. Consisting generally in intravenous inoculations, of tubercles the size of a pin at most, unless the disease progresses slowly, they are irregularly distributed, and not very numerous. Of greyish and transparent appearance, like all young tubercles of the lung, these granulations originate through the same

process as that by which the mycotic tubercles of the other organs are formed. Ending in the capillaries, the injected spores give birth to mycelian branches, which are soon surrounded by white globules or giant cells, and the lesions thus caused are seen to be more or less rich in mycelium and leucocytes in proportion to their age. In intratracheal injections, when they succeed, the pulmonary injuries are very much like those observed in birds in spontaneous mycoses. The tubercles still exist, but there are found besides lesions, like scales, on the bronchi, caused by the grafting of the spores injected on the mucous membrane of the trachea, with an appearance identical to that revealed by the spontaneous mycelian lesions of birds, which have already been described. When the tubercles settle in the muscular tissue they assume an elongated shape, according to the direction of the fibres, and meet again in the femoral adductor muscles, in the abdominal and intercostal muscles, and in the diaphragm. There, too, their presence provokes a reaction on the part of the surrounding tissue, betrayed by a more or less marked change of the muscular fibrilli. The mycotic tubercles of the intestinal organs, the mesentery and epiploon, though rare in intravenous inoculations, are common in intraperitoneal injections. Consisting of whitish granulations of a pretty regular spherical form, firm to the touch and settling in the thick portions of the intestinal walls, in the muscular tissue, or in the mucous membrane itself, they always show the same histological composition, and originate in the development of the spores arrested in either the capillaries of the blood, if the inoculation has been intravenous, or in the smaller lymphatic vessels when the inoculation has been made directly in the peritoneum. As to the lesions of the bones and encephalum, they are still rarer. The former are met with principally in young animals, on the level of the epiphyses or of the joints of the longer bones, and only once have I seen the second in the cerebellum of a rabbit, which, from the second day after inoculation and up to its death (which took place on the sixth day), had rolling movements on its axis from one side to the other of the most curious kind. These injuries, even in this part of the body, showed invariable histological characteristics. To sum up, whatever be their locality, kidneys, liver, spleen, lungs, intestines, etc., the experimental mycotic lesions belong to one type, the tubercle, and the process to which their formation is due does not vary. Injected into the circulatory system or into any great serous cavity, the spores that have drifted into the blood or into the lymph end in the capillaries or the finer lymphatics and give birth to mycelian filaments against which the system struggles by means of phagocytosis.

THE EXTINCTION OF GLANDERS.

In its acute form glanders, as we all know, is a terribly fatal disease when it attacks man, and hardly less so in its chronic form of "farcy." Every year it claims a certain number of victims in various parts of the United Kingdom, chiefly among stablemen and those who are brought into close contact with horses. It belongs to one of the great class of specific diseases that modern science has traced to a microbic origin, and rejoices in a micro-organism "about as long as the tuberculous bacillus," and a little thicker, that is to say, it is a preventible malady, which is the crux of the matter. Here we have a frightful disease, contagious to man, and almost entirely confined to large stables, which rigorous measures would infallibly destroy, root and branch, but which is allowed to linger on and spread its deadly poison among the community. Its prevalence in London is proved by a report recently issued by the County Council, showing that between April 1st, 1896, and March 31st, 1897, 868 cases of glanders were dealt with by their

veterinary inspectors. The recorded numbers of cases during 1896 for Middlesex was fifty-two, for Essex forty-nine, for Kent twenty-one, and for Surrey twenty-seven. The actual numbers, however, probably far exceed those figures. When the disease appears in some stables it is strongly suspected that many horses are weeded out by the injection of mallein, which produces a feverish reaction in affected animals even when they show no otherwise recognisable signs of the disease. In this way it is thought that not a few infected animals are picked out and scattered over the kingdom, where they act as centres of fresh infection. The method is simple as it is scientific. The owner of a large stable finds one of his horses affected with glanders. His veterinary surgeon straightway injects all the rest of the horses with mallein, and those that show any reaction are at once sent off to the auction mart. Indeed, sharp practice of this kind is just the very thing that would appeal to the ethics of the stable, where the great general law of morality might aptly be written in the short phrase, *caveat emptor*. However, cunning horse-owners must not be allowed to endanger the safety of the public any more than careless or ignorant people are permitted to spread abroad certain specified infectious diseases, as scarlet fever and small-pox. One way of guarding against imposition would be for the purchaser to buy subject to the satisfactory result of a mallein test; or local authorities might exact proof of a horse being mallein-proof before sale by auction. The whole matter, however, is beset with difficulties, and the particular form of fraud involved is extremely difficult to detect. The attention of practical health administrators may in the meantime be concentrated upon the large stables, where there is every reason to believe the disease finds its chief habitat, and is therein enabled to escape eradication. If a percentage of infected horses is smuggled off to other parts of the country, then the slaughter of the remainder and disinfection of stables is clearly rendered little more than useless. Such a position might be illustrated by the parable of a field containing thirty vipers which a farmer wished to exterminate, but after killing twenty allowed the rest to escape into neighbouring fields, where they bred, and one day returned in an army and destroyed the farmer. So far as the 868 cases of glanders reported in the metropolis during the last official year, all were slaughtered, and compensation allowed of not less that £2, or not more than a quarter of the value of the animal before it became infected. If on *post-mortem* examination a horse suspected of being glandered proved not to be so, the full value of the animal was paid by way of compensation. So far as the spread of the disease is concerned in this country a weak link in the chain of prevention is the importation of fresh cases. Some well-considered recommendations of the Public Control Committee of the London County Council to the Board of Agriculture meet that point, and, indeed, cover most of the ground. They certainly deserve the immediate and careful attention of Government. Broadly speaking, they seek for further powers in three directions: (1) Compulsory notification by veterinary surgeons of cases of glanders within their knowledge; (2) inspection and sanitary supervision of trade stables; (3) the requirement of statutory evidence of freedom from disease before horses are allowed to be imported, in order to guard against the introduction and spread of disease by imported animals. To this might, perhaps, be added the regulation that any sale of a horse, afterwards found to have been suffering from glanders, should not be held binding. So long as a dealer or owner may save his pocket by palming off glandered horses as sound, so long will the extermination of the disease defy the energies of local authorities. Meanwhile the steady decrease of glanders and this wide interest shown in this matter, prove once more the important hold that preventive hygiene has taken upon the mind of the public.

THE TRAINING OF ATHLETES.

DESPITE the great devotion shown in these islands to athletic pastimes of various descriptions, the fact remains that much difference of opinion prevails among experts regarding the best method or system for the training of athletes. This is a somewhat remarkable position of affairs, for while the training of racehorses seems to be carried on in a thoroughly systematic manner, the same cannot be said when men have themselves to be trained for similar feats of physical endurance. Reflection also shows that the whole of the methods of athletic training at present in vogue have more or less the attributes, so to speak, of empiricism. That is to say, no scientific basis has been demonstrated upon which they could have been framed. In a haphazard way certain rules and regulations are laid down by persons claiming to speak with authority upon the subject, the following of which is held to be essential by those who desire to be trained for an athletic contest. Sometimes, of course, the result is satisfactory, and the training proves successful. But not infrequently the opposite is the case, and failure follows. In a contest, for example, like that of the inter-university boat-race, a great deal depends upon the success of the training. Unless each individual member of the respective crews is able to put forth all his strength, and to develop his best energies in seeking to win the contest, his colleagues have to suffer from his lack of capacity. Herein, then, comes the great importance of framing a definite system of training which shall have the effect of turning to the best account the capacity of each individual. Of course, it must be the case that the necessary degree of training varies with the man. Some men will require much more preparation than others—in other words, the stage of perfection in this respect may be reached sooner in the latter than in the former. To adopt, therefore, a hard-and-fast rule in these matters is obviously wrong, and is calculated to precipitate disaster both as far as the success of the special contest is concerned, as well as to those who take part in it. To be over-trained, for example, is one of the worst results which can happen to an athlete; and because the various systems of training are not based upon scientific principles, there is always more or less risk that over-training may occur. This subject has lately attracted some public attention owing to the fact that a well-known professional athlete has asserted that the present methods of training submitted to by oarsmen and runners not only do not conduce to health, but are positively injurious and dangerous. He affirms that training, so far as amateur athletes are concerned, is largely a matter of dieting and living by hard-and-fast rules. It means living for a considerable length of time under entirely different conditions from those to which a man has been accustomed. The young man who, prior to his period of training, has been living an ordinary life, suddenly finds himself denied many of the little luxuries he has been accustomed to indulge in, and upon the top of this he has to do an extra amount of hard, physical work; the engine has to put out more energy by the aid of fuel which is, perhaps, utterly unsuited to it. No doubt these are largely the conditions under which athletes are expected to develop their best energies, and it is impossible to concede that they partake of anything more than of the character of rule-of-thumb precepts. In these days, therefore, of highly developed athleticism, it is very important that a scientific system of training should be devised, and rules and regulations laid down in connection therewith, based upon scientific data. If this were the case—if, that is, the empiricism of the present methods were displaced by a definite system of training which science could endorse—it is quite possible that the great athletic contests which annually take place throughout the country, would show still better results in the future than they have done in the past.

UNTRUSTWORTHY CLINICAL THERMOMETERS.

DURING the last twenty-five or thirty years the clinical thermometer has come into such general use that its trustworthiness has become a matter of considerable professional importance. Improved methods of manufacture have, of late years, resulted in a great reduction in the price of this valuable aid to diagnosis, but its accuracy still leaves much to be desired, at any rate, in respect of the cheaper varieties. As a matter of observation, it is quite exceptional to find a clinical thermometer more than approximately accurate. If the error were what may be described as systematic—that is to say, if it were uniform throughout the scale—a deviation of half a degree to a degree might be ignored, but the examination of a large number of thermometers purchased of various dealers revealed to the inquirer the disquieting fact that the error is usually unequally distributed owing to a want of uniformity in the bore of the glass tube. Such an instrument can only give fallacious and misleading information, and the worst of it is that one cannot be sure of obtaining a really accurate instrument, even by paying a high price. Most of them are "made in Germany," and their wholesale price is under a shilling each. These are sold retail at prices varying from half-a-crown to seven or eight shillings. Probably the best way to secure an approximately correct instrument is to buy half-a-dozen of the cheaper thermometers, and to select therefrom the one which appears to give the most uniform results. *Revue Scientifique* relates a story of a thermometer bought for ten shillings, which was found to err to the extent of ten divisions, *i.e.*, one degree centigrade scale. This was returned to the vendor with a request for a more perfect instrument, but even then the new instrument was five divisions out. In this country, it is true, some sort of guarantee is afforded by a Kew certificate, but even then only comparatively gross errors are likely to be detected, given the time and attention which a really serious examination would entail. As matters stand, the practitioner who deliberately purchases a thermometer which does not bear the Kew mark courts disaster, though it is only fair to add that there are one or two manufacturers in this country whose thermometers are made with such skill, and are so carefully examined before being placed on the market, that this precaution might almost be dispensed with.

AN ADDRESS ON ACQUIRED IMMUNITY.

BY G. ARCHDALL REID, M.B.EDIN.

GENTLEMEN,—Against some zymotic diseases, *e.g.*, smallpox and measles, an average individual is able, through illness and recovery, to acquire life-long immunity; against other diseases, *e.g.*, diphtheria and relapsing fever, immunity may be acquired, but is of limited duration only, and in a shorter or longer time the individual, lapsing his acquired powers of making resistance, becomes as liable to infection as ever he was. Against a third class of diseases, *e.g.*, tuberculosis and leprosy, immunity can never be acquired; in other words, experience of such diseases never confers on the sufferer increased powers of making resistance, even for a limited time, whence it follows, as a corollary, that such diseases may persist in the individual for a length of time that is only limited by the duration of his life, no matter how long that may be.

Now, it is very noteworthy that it is only against diseases the micro-organisms of which produce more or less powerful toxins—as judged by their systemic effects—that immunity can be acquired. When the toxins are feeble or non-existent—*e.g.*, in tuberculosis and leprosy,—when the onset of the

disease is unmarked by symptoms of poisoning, when the pathogenic micro-organisms, instead of engaging at long range, enter at the outset into what may be termed an actual physical struggle with the phagocytes, which, undeterred by toxins, at once attack the disease germs, and taking them into their substance attempt to destroy them, then immunity cannot be acquired. Malaria is an apparent exception to this rule, for here the toxins are undoubtedly powerful, yet immunity seemingly can never be acquired; but it seems probable that this disease should rather be regarded as one against which more or less complete immunity is very rapidly acquired and as rapidly lapsed, for thus only can we explain the alternations of extreme illness, during which the parasites are abundant in the blood, with comparative health, during which they are absent or almost absent from it, and when such of them as still survive the assault of the phagocytes probably exist in a comparatively harmless but highly resistant form—*e.g.*, as resting spores. Moreover, the completeness with which immunity may be produced against any disease, though not its duration, seems, generally speaking, in direct proportion to the quickness with which the toxins are produced and to their degree of virulence. The duration of the immunity depends on factors of which we have as yet no knowledge; but it seems more than probable that it is determined by the chemical constitution of the toxins in each disease. It is clear, then, wherever immunity can be acquired against any disease, that it is associated as effect and cause with the fact that in any such disease more or less potent toxins are always present. In a recently published work* I endeavoured to show why this must necessarily be so; but recent though the work is, still more recent researches, especially those in snake venom by Professor Calmette and Professor T. R. Fraser, render necessary further developments and emendations of the hypothesis set forth in it—a hypothesis that is founded on Metchnikoff's famous theory of phagocytosis.

Different inquirers have propounded different theories of *rationale* of acquired immunity. It has been supposed (Pasteur) that the pathogenic micro-organisms of each disease against which immunity may be acquired find, every species of them, some special pabulum on which they subsist but on which no other species subsist, and that when this special pabulum is exhausted they perish from starvation. In diseases against which acquired immunity is usually permanent—*e.g.*, small-pox—this pabulum, it was supposed, is usually not renewed; but when immunity is not permanent—*e.g.*, diphtheria—it is renewed, whereby the individual once more becomes susceptible. Again, it has been supposed (Chauveau) that acquired immunity arises because the waste products of micro-organisms are inimical to their own life, as alcohol is to yeast; and, therefore, when this reaches a certain percentage in the fluids of the host the micro-organisms perish, as yeast perishes when alcohol reaches a certain percentage in a solution of sugar. In diseases against which acquired immunity is permanent it was supposed by this theory that these waste products are permanently bottled up within the host, but that they are eliminated after a time in diseases against which immunity is not permanent. Both these hypotheses are negatived by the fact that the micro-organisms of certain diseases, *e.g.*, anthrax, are able to flourish in the blood serum of animals that have acquired immunity against them. Metchnikoff's theory supposes that certain cells of the body known as phagocytes attack and destroy the micro-organisms when they find entrance, and that when toxins are present these cells acquire powers of resisting or ignoring them; and, further, when immunity is permanent such powers are permanent, but when immunity is only temporary they are after a time lapsed.

* "The Present Evolution of Man."

It is now beyond dispute that phagocytosis does occur. All that is in dispute is whether it is the sole or even the principal cause of immunity. More recently Behring has propounded the theory, which received very general assent, that acquired immunity is due to the elaboration by the host of specific antitoxin substances which chemically neutralised or antagonised the specific toxins as an acid is neutralised by a base. Lastly, Fraser* and others, modifying Behring's theory, have surmised that the antitoxins are constituents of the toxins, or else by the action of the host are produced from them, and, like Behring, Fraser thinks that they chemically neutralise the toxins. The theories of Pasteur, Chauveau, and others which it is needless to mention, had their day, but are now known to be erroneous. Metchnikoff's theory was in vogue for some years, but lately seems to have passed somewhat into the background ; whereas Behring's theory, or modification of it, like Fraser's, appears so well to fit many of the ascertained facts, especially those most recently ascertained, that they are now largely accepted. In particular, Behring's theory appears to be in accordance with his own highly important discovery that if the toxins of a pathogenic organism be injected in proper quantities and for a sufficient length of time into the body of one of the higher animals, the blood serum of this animal acquires specific antitoxic properties ; that is, a given quantity of it tends to neutralise or render harmless given quantities of the tonins of that particular organism, not only when the substances are mixed *in vitro*, or when they are injected separately into the body of another and a susceptible animal, but also during the course of disease, when the specific toxins are produced within the body, and the specific antitoxin alone is injected ; while they do not neutralise or render harmless the toxins of any other species of micro-organisms. But apart from the inherent improbability that the animal body is a species of magic bottle, producing at need highly complex chemical substances, the so-called antitoxins, which exactly neutralise or antagonise other highly complex chemical substances, the toxins, the right antitoxin at the right time, as Behring thinks ; or that the toxins contain, or are capable of being converted into substances chemically antagonistic to themselves, and to no other toxins, as Fraser thinks, there are certain facts known to us concerning various diseases which prove that neither theory, even if correct, offers a complete explanation of all the facts, while a closer examination furnishes solid grounds for doubting whether either offers a correct explanation of any of them.

For instance, Pasteur killed rabbits suffering from rabies and dried their spinal cords. His treatment for the cure of an infected subject consisted in the injection into him of an emulsion from an old and thoroughly desiccated cord, was continued by injections from fresher and fresher cords, and ended by the injection of an emulsion from a cord that was absolutely fresh and virulent. By these means he enabled many individuals, who already had been infected, and would otherwise have perished, to acquire immunity. It is clear that the immunising agent, the "antitoxin," is here produced in the dead and drying cord, not in the living infected animal from which the cord was taken, since in the latter case such an animal would not perish if left to itself, as it invariably does, and since the immunising substance is procurable from old and dried cords and not from those which are absolutely fresh. It is, therefore, not produced by the vital action of the cells, but arises in the absence of all vital action in a dead thing. No doubt chemical changes do occur in a desiccating cord, but it would be strange if these resulted (1) in substances chemically antagonistic to the particular

* *Vide* Abstract of Lecture, *The Lancet*, April 25th, 1896 ; or a full report in *Nature*, April 16th and 23rd, 1896.

toxins and to no other, or (2) in the conversion of the toxins into substances chemically antagonistic to themselves, or (3) in the destruction of the toxic portion of the poison, while a hypothetical antitoxic portion was left unaltered. Again, by submitting the bacilli of anthrax to an abnormal degree of heat (from 42° to 43° C.), Pasteur found that they gradually lost their virulence, and found, moreover, that if sheep were inoculated first with bacilli of little virulence, next with those of greater virulence, and, lastly, with bacilli of great virulence, the animals could be rendered immune to bacilli of the greatest virulence, and could thereby be protected against the disease. In this case the bacilli are introduced alone, or with an insignificant amount of toxin. The "antitoxins," whatever they may be, are elaborated within the sheep, and it is difficult to understand, if they are substances chemically antagonistic to the toxins, why they should be elaborated only when the animal has undergone such treatment and not otherwise. Again, if we pass the virus of small-pox through a series of calves, the organism producing that disease becomes so "attenuated" that if a human being is vaccinated from the calf there results not variola but vaccinia. In this case, as in vaccination against anthrax, only the attenuated micro-organism, with at most an infinitesimal amount of its products, is introduced, yet the result is that the powers of resisting the graver disease are acquired. Here, again, chemical neutralisation cannot possibly play a part. Lastly, the micro-organisms of certain diseases (*e.g.*, malaria), vary greatly in virulence, sometimes being productive of a very grave disease, and at other times of a much milder disorder.* To this category belong the bacilli of diphtheria, and it has been found in German hospitals when, owing to the difficulties in the way of efficient nursing during a widespread epidemic, mild cases were admitted among the graver cases that the latter showed a greater tendency to mend than had been observed before. Here, also, the production of chemically antagonistic substances can hardly have had anything to do with the improvement; but we may well believe that in this case also the improvement was due to attenuated bacilli from the milder cases finding their way to the severer, where their weaker toxins furnished stepping stones for the attainment of resisting power against the stronger.

Now these facts and many others, as we shall see, are in full accord with Metchnikoff's theory, but are not at all in accord with Behring's. We may believe that in the drying cord of the hydrophobic rabbit, in the abnormally heated anthrax culture, in the calf infected with the organisms of small-pox, in the mild diphtheritic cases, the pathogenic organisms are so altered that they produce enfeebled toxins, and that by these enfeebled toxins the cells (probably the phagocytes) of the infected animal are so inured, so educated, that they are able to resist the stronger toxins of the normal microbes and to destroy the pathogenic organisms producing them; but it is at the least a gratuitous assumption to suppose that micro-organisms, which have been attenuated or constitutionally modified by subjection to a changed environment, produce secretions chemically antagonistic to those which they produce in their normal surroundings, or, on the other hand, as the only alternative, that the infected animal produces them the more readily for previous experience of these attenuated toxins. The process whereby the infected animal acquires immunity, whereby it becomes so modified that it is able with comparative ease to resist the effects of toxins which before it was incapable of resisting, or could have resisted only with difficulty, is, after all, no miracle, but only a particular manifestation of that power of acquiring a multitude of fit traits by means of which high animal organisms place themselves in harmony with their enormously complex environment. I have dealt at length

* *Vide* "Present Evolution of Man," pp. 239—40.

with this interesting question of acquired traits elsewhere.* It is needless to repeat arguments which, as far as I am aware, have received general assent. It suffices to remark that while such a phenomenon as the production by pathogenic micro-organisms in a changed environment of toxins which are chemically antagonistic to those which they normally produce, or the production by an infected animal of antitoxic substances chemically antagonistic to the toxins of the microbes by which it is assailed, has no parallel in nature, that process of adaptation by means of which, as I here suppose,† the phagocytes or the other cells concerned are gradually so modified constitutionally that they are able to resist microbic poisons which before they were unable to resist, has innumerable parallels. Thus, for instance, if the mucous membrane or the external skin be subjected to intermittent heat or friction, or the action of chemical irritants, the cells of it become so modified, both as regards quality and numbers, that they become capable of resisting degrees of heat and friction, etc., which would otherwise injure or destroy them. Thus, also, muscle cells, under the influence of intermittent exercise, acquire additional powers of resisting fatigue. But the closest parallels are furnished by the increased powers of resistance which man is able to acquire against various poisons, for instance, arsenic, opium, and nicotine (the last two being to all intents and purposes toxins, since they protect the organisms producing them against other organisms to which these are liable to fall a prey). Here, again, we may well believe that the cells concerned—nerve cells, etc.—become, through experience of these poisons, so constitutionally modified that at length they are better able to resist them when presented in larger and more concentrated doses than before they were able to resist them when presented in weaker doses. I suppose that no one will maintain that increased resistance to opium, arsenic, or nicotine results from the manufacture of a substance antitoxic to these poisons. Yet it would be as reasonable as to suppose that immunity from rabies, anthrax, or small-pox results from similar causes. I think, then, we may fairly conclude that (in the cases cited at least, and probably, as we shall see, in all others) the essential feature of acquired immunity (or increased powers of resistance) is an habituation of the cells concerned to the toxin, as a result of which their phagocytes are able to destroy the pathogenic micro-organisms producing it; and, further, in cases where the toxins are very poisonous, that this habituation, this power of ignoring the toxins and destroying the microbes, is more easily achieved (just as other acquired traits are more easily achieved) gradually, by a series of efforts than at once by a single effort, so that in such an extreme case as rabies, when the toxins are so virulent that normally reaction to them is impossible, immunity may be obtained by subjecting the animal first to weaker and then to stronger toxins, till at last it is able to resist even the strongest toxins, and so escape an otherwise inevitable death.

The principal objections to this view have origin in Behring's discoveries, and from them have resulted his theories and such modifications of them as Fraser's. It was found by him that if toxins—*e.g.*, those of diphtheria—be injected into a living animal—*e.g.*, a horse—beginning with small non-lethal doses and proceeding at intervals to stronger and stronger lethal doses, that the animal experimented on not only acquires immunity against the disease and powers of resisting enormous doses of the toxins, but also that its blood serum (1) when injected into an animal susceptible to the disease tends to render it resistant, just as progressive doses of toxin would; (2) when injected into an animal already suffering from the disease tend to bring about a cure, and (3) when injected before or at the same time, or

* "Present Evolution of Man," pp. 114—19. † A view first set forth by Tizzoni and Cattani.

when mixed with the toxin *in vitro* previously to injection, tends apparently to neutralise or antagonise the toxin; so that, especially in the last case,* doses of the toxin much larger than those which are ordinarily lethal can be borne with impunity. Moreover, Fraser found that if snake venom be swallowed, as it may be, in enormous quantities without injury, that then also the animal experimented on acquires immunity and its serum antitoxic properties. In all these instances it was found that the acquired powers are specific—that is, experience of the toxins of any disease confers immunity against that disease alone and not against any other, while the resulting serum also confers immunity against, has curative powers against, and antagonises the toxins of that disease and no other.

Metchnikoff's theory furnishes an explanation of the increased powers of resistance to any toxin which experience of it confers on the serum producer. In this case, as in disease, we may suppose that the cells concerned become habituated to the toxins, hence the high degree of resistance. But the theory as set forth above is totally inadequate to account for the rest of the phenomena just detailed. Presumably the antitoxic serum contains toxins in solution. It follows, then, that this serum, instead of conferring immunity or antagonising the toxins, should add to the effect of them by increasing the dose. The fact, however, is the reverse, for it clearly does confer immunity and apparently also, judging from the experiments *in vitro*, it does antagonise the toxins. Except, then, these difficulties are surmounted we must abandon the theory which supposes that increased powers of resistance are due to increased powers of toleration.

The key to the mystery is probably furnished by Fraser's experiments. We have seen that snake poison may be swallowed in enormous quantities when, so far from causing death, it actually confers some degree of immunity on the animal swallowing it and some degree of immunising power on his serum. Fraser, indeed, conjectured "that the venom while in the stomach had been subjected to a process of analysis by which the constituents which are poisonous had failed to be absorbed into the blood or had been destroyed in the stomach while the constituent or constituents which are anti-venomous, or rather antidotal, had passed into the blood in sufficient quantity to protect the animals against otherwise lethal administration of the venom."† But this conjecture seems very improbable and far-fetched. On biological grounds it is highly improbable, to say the least, that snake venom contains a substance antidotal to itself—*i.e.*, that the animal's weapon of offence and defence has combined with it a substance which enfeebles it. Again, it is not in accordance with known facts that the alimentary canal possesses the power of intelligent choice which Professor Fraser attributes to it, by virtue of which it accepts the good and rejects the evil. The function of the canal is digestion; and surely, since animals are not poisoned by huge doses of swallowed venom, we are entitled to assume that the venom, like other proteids, undergoes digestion; and, further, since the swallowing of venom confers on the animal increased powers of resisting the injected poison, and on its serum antitoxic properties that these effects are due to a reaction, induced by the altered, the attenuated, the digested toxins, of a similar nature to that induced by other altered and attenuated toxins—*e.g.*, those of rabies, anthrax, or small-pox. If this be admitted, as I think it must, then we arrive at the conclusion, of great importance in our inquiry, that here the venom is attenuated by ferments secreted by cells lining the alimentary tract, not by the cells themselves—that is, by ferments which digest the toxins extra-cellularly, but are innocuous to the cells themselves.

* At least, so Fraser alleges, though his statement appears now to be disputed.
† Vide *Nature*, April 23rd, 1896.

Now, phagocytosis itself, whether in low unicellular or high multicellular organisms, is nothing other than a process of digestion—*i.e.*, the cells destroy the micro-organisms which they have taken up, not by mechanical means, by pressure, or by tearing, but, as cannot be doubted, by digestive substances which they secrete, and it has been further proved that they are capable of performing the digestive act, not only intracellularly, but like the stomach cells or the cells of the pancreas and the salivary glands, extracellularly also. For instance, Metchnikoff found that when the gregarines which infest the male genital organs of the earthworm become passive previously to spore formation, they are attacked by wandering cells which form a thick plasmodium round them. The parasite on its part forms a thick cyst-wall, but, nevertheless, frequently undergoes degeneration and death. Kanthack and Hardy found that when anthrax bacilli are introduced into frog's blood, "the coarsely granular oxyphile cells act as unicellular glands, discharging or secreting their granules, and these granules dissolving appear to exert a deleterious action on the bacilli, in consequence of which the hyaline cells are now capable of ingesting them."* Other inquirers have made observations of a like tendency. And it has also been found that intruding micro-organisms perish when at a distance from the cells, as well as when they are ingested, or when the cells are applied closely to them. Thus Nuttal, on introducing a fine cannula containing attenuated anthrax bacilli into a rabbit's ear, found that phagocytosis reached its maximum after twenty-two hours, but that even then half the bacilli lay free and not ingested by the phagocytes, but exhibited, nevertheless, as much signs of degeneration as those which had been ingested. Thus also it has been found that during recovery from diphtheria and pneumonia numbers of the pathogenic microbes perish without direct conflict with the cells. It is not too much to assume that the same agent causes the death of free microbes as that which causes the death of those which are actually ingested or those to which the phagocytes are directly applied. In other words, we have good reasons to believe that they perish by reason of a digestive substance secreted by the cells, and set free into the fluids of the body, just as pepsin is set free in the fluids of the stomach. Direct evidence of the presence of this digestive substance was furnished by Leber, who placed pieces of copper in the anterior chamber of the eye, producing a purulent collection devoid of micro-organisms, the exudate from which was capable of digesting proteid matter. This, then, since it is highly improbable that there is one substance which destroys the bacilli at close quarters, and another which destroys them at long range, is probably the germicidal substance found in the plasma and the serum of immune animals. But, of course, the digestive substance must be in greater concentration within the cells producing it, and in their immediate neighbourhood than at a distance, and, therefore, it must act more effectively in the former than in the latter case. On the other hand, the toxins produced by the microbes must also be in greater concentration, and must act more effectively on objects in their immediate neighbourhood, and especially on those with which they are in actual contact, for which reason, doubtless, it is that micro-organisms which do not produce toxins, or produce only feeble toxins—*e.g.*, those of leprosy and tuberculosis—are at once attacked and taken up by the phagocytes, while micro-organisms which produce strong toxins—*e.g.*, those of anthrax and diphtheria—are not taken up till a later period, when the phagocytes have become habituated and resistant to the toxins, or even are not taken up at all, but are engaged only at long range. It is probable that the digestive substance produced by the cells is

* "Adami: a System of Medicine," by Many Writers, p. 91.

normally present in them, but that its secretion is greatly accelerated by the presence of certain foreign bodies in the blood—*e.g.*, bacteria and their toxins.

But besides the germicidal substance there is irrefragible evidence proving that in the blood of an infected but resistant animal, or in that of a resistant animal into which toxins have been injected, there is present another and probably a distinct substance* which destroys or renders inert the toxins; and, reasoning from analogy, this also, in all probability, is a digestive substance. The commonly accepted theory is that it is a substance which chemically antagonises the toxins; but such a view commits us, as we have seen, to the belief that all the separate toxins of the separate diseases are separately antagonised by different antitoxins—a belief hardly reasonable when we consider the multitude of the diseases and the complex chemical nature of their toxins. On the other hand, it is by no means incredible that a single digestive body is capable of digesting all these "toxalbumins" just as pepsine is capable of digesting a variety of proteid substances, or even that there are two or three different digestive bodies which severally digest the toxic albumoses, globulins, peptons, &c., which the different species of pathogenic micro-organisms produce. Moreover, this antitoxic substance is very rapidly produced, since it has been found in blood drawn from a rabbit's ear immediately after the introduction of the toxin, this seems still further to confirm the view that it is a digestive body; for while appropriate stimulation (that from a toxin) might well cause its rapid secretion by cells that manifestly do perform digestive functions and otherwise closely resemble their remote amœboid ancestors, it is likely, not to say impossible, that these cells can instantly elaborate the right chemically antagonistic substance when they are assailed by this or that toxin, especially when the toxin is produced by a microbe of which their ancestry can have had no experience, and against which, therefore, no specific powers can have been evolved. I think we may fairly conclude, then, that the destruction or attenuation of toxins which occurred in the body of a resistant animal is due to their digestion by an enzyme secreted by cells that have that special function, and it follows, if this view be true, that when a resistant animal is recovering from a disease in which toxins are abundant, or when repeated doses of toxin are injected into a resistant animal, there must be present in his blood and in his serum when drawn off, firstly, two or more digestive substances, and, secondly, *toxins in all stages of digestion.*

(*To be continued.*)

Notes and News.

A Breach of Warranty Case.—At Stourbridge County Court, before Sir Richard Harrington, Bart., Arthur Timmins, builder, Hales Owen, sued Alfred Hall, the Royal Oak Inn, Hasbury, for £10 for breach of warranty.—Plaintiff's case was that he bought the horse in May last from defendant, who said he warranted it to be as sound as a bell. The price was £12, but 5s. was given back. Next morning the horse drew some ashes, went to Old Hill, and

* This would appear from Klein's experiments. That observer found that if pure toxins were injected in sufficient quantities into a horse, the serum acquired a high antitoxic but comparatively low germicidal power, whereas if bacilli were injected the reverse occurred. Frankel claims to have separated the antitoxic from the immunising substance by heat.

afterwards drew some clay, without showing any signs of lameness. Afterwards, however, after it had been some time in the stable, plaintiff found it very lame. Defendant refused to have the horse back and return the money, when asked to do so, and the horse was sent to Cave's Repository and sold for £4 14s. 6d.—Cross-examined, plaintiff denied saying to defendant that if the horse was sound it would be worth £30, but that he (defendant) knew it had been fired.—Mr. W. Bailey, veterinary surgeon, Hales Owen, said on May 29 he found the horse very lame with spavins on both hocks, and the fore feet had very bad large side-bones. The horse was only fit for the knacker's yard. In his opinion the defects had existed for years, and one hock was half as large again as the other.—The Judge: The most stupid person could have seen that!—Witness said anyone could have seen the one was larger than the other.—Mr. Mellor (who appeared for defendant) asked witness if he knew the horse was still at work in Hales Owen?—Witness said if it was now at work, it was unfit to work.—His Honour: Have you anythiug to do with the Society for the Prevention of Cruelty to Animals?—Witness: No, sir.—Mr. George Partridge said he did not agree with the veterinary surgeon as to the lame condition of the horse. Witness bought it at Cave's Repository, and it was fit for regular work now, and he worked it without any fear of prosecution. The horse was not now lame. It was a bit stiff in the morning, but after being out for a few minutes it was all right.—Daniel Parsons, Hasbury, said he could not see anything the matter with the horse.—His Honour said he was not satisfied that a breach of warranty had been proved. The evidence of the horse dealers took away the value of the evidence of the veterinary surgeon, and this evidence gave the complainant's case away, when the one man said he now had the horse and was not afraid to use it, though, if the veterinary surgeon's opinion was correct, he would be in perpetual fear of prosecution by the Society for the prevention of Cruelty to Animals. The question was, assuming there was a warranty, whether the existence of spavins and side-bones, apart from lameness, was unsoundness, and he did not think it was. Mr. Oliphant, in a book on the law relating to horses, handed up to him by Mr. Dorsett (who was present at the advocate's table), laid it down as a general proposition that spavin was unsoundness. He did not agree with that. The question was whether the disease was of such a character as to cause lameness. If so, it was unsoundness. If it was a mere malformation which made a horse unsightly, and did not produce lameness, that was not unsoundness, in his opinion. He nonsuited plaintiff.

Death from Anthrax.—At Bradford lately a woman who had been engaged in wool-sorting died from anthax. At the inquest it was shown that this woman was allowed to go to work while wearing bandages, rendered necessary by the infliction of a wound on the arm. The dust from the dust chambers, removed once a week, should, by the regulations laid down, be burnt; but it is alleged that it was given away for the purpose of being transformed into an artificial fertiliser or manure. It seems incredible that people should think of using such a material for land. It was urged that disinfectants were sprinkled over the floors of the rooms in which the wool-sorters were working. It seems absurd, says the *Lancet*, with our present knowledge of of the resisting power of anthrax spores "to play with them in this fashion." Nothing but the most careful disinfection can be of the slightest value, and the mere sprinkling of disinfectants simply leads to a false sense of security and to the neglect of real precautions. What with the minimising of the draught, the contracting of the flues, the irregularities as regards opening bales in rooms not specially set apart for the purpose, and similar breaches of regulations, the astonishing thing is that fallen Persian wool, even when greasy, does not give rise to more cases of anthrax than are at present attributed to it.

FAILURE TO REPORT GLANDERS.—At Southwark recently Mr. Ailsby, contractor, of Cross Street, Chelsea, was summoned by the London County Council for neglecting to notify to a police officer that he had a horse suffering from glanders, and, further, with causing the animal to be led through the streets from Chelsea to Blackfriars.—According to the evidence for the prosecution, the horse was sent to Harrison's knacker's yard at Green Street, Blackfriars, because it had been unwell. Suspicion was aroused that the animal was suffering from a contagious disease, and a veterinary surgeon who was sent for certified that the horse was suffering from glanders.—In defence, Mr. Ailsby denied that he had any knowledge of the actual condition of the animal, otherwise he would not have allowed it to be stabled with his other horses.—Mr. Fenwick said the defendant had not exercised proper care to find out the animal's condition. Serious consequences were likely to arise from such neglect, and he would be fined £10 and £2 2s. costs.

FIGHTING THE RINDERPEST.—A Basutoland correspondent sends a photograph of the inoculation of cattle under Dr. Koch's system, and writes:—"I am sorry to say that all the cattle shown in the photograph died. Nobody seems really to know if it is any good inoculating in Dr. Koch's way or not. Most of them seem to believe in inoculating with the blood. The chiefs don't believe in it, as they have had whole herds done and lost them all. You really have no idea of the ravages which the rinderpest has made. Many of the natives have lost all their oxen, and now that the ploughing season is on they have to plough with 'picks,' and the stench of the dead cattle is fearful. Riding anywhere you come across hundreds of bodies, as although the authorities started burying them, they cannot cope with such numbers. Professor Davies, veterinary surgeon from Edinburgh, is inoculating in Basutuland, and seems to be very successful. He is also liked by the natives—a great thing in this country.

CROSS-BREEDING EXPERIMENTS.—A Texas cattle-breeder has been trying some experiments in crossing the American buffalo with different breeds of cattle. The only breeds with which the animal will cross are the native Texas cow, the Galloway, and the Polled Angus, and it is mentioned as a proof of the prepotency of the Galloway that the calves from this cross are hornless, while curiously all the calves from the Polled Angus—which cross proves the most certain and satisfactory of all—are heifers. The half-bred Polled Angus breeds every year, while the buffalo cow breeds every second year only. The half-bred cow, mated with a buffalo, produces some bull calves, but these males are all sterile, though the three-quarter-bred heifers breed readily. The peculiarity of the production of heifers only from the cross is a striking feature, and it may eventually give us some information concerning the law that governs sex—a matter on which so little is known.

Extracts from Foreign Journals.

MURDEROUS EFFECTS OF A LEBEL BULLET.

ON the 24th April last two carriage-horses were accidentally killed a few kilomètres from the Belgian frontier by a Lebel rifle bullet, model 1886. It was at a distance of from about three to four mètres, at an angle of 40°, in an oblique direction from in front to behind and from left to right, that the shot was fired. The bullet, after piercing through and through the two horses harnessed to the carriage, striking first the near horse, and then the off one, whose immediate death it caused, the former making a few steps before

sinking down, ricocheted against a wall and was found thrown back on one of the edges of a milestone, which it chipped off and broke.

One of the two victims, the near one, showed at about five centimètres above the point of the left shoulder a small circular opening, a kind of infundibulum made just as if by a punch; this was the orifice where the projectile had entered. On a level with it, without any change having taken place in the appearance of the integument, this traumatism spread across the sub-scapulary muscles in a course surrounded by a strongly hemorrhagic coating, strewn thickly with calcined muscular detritus, then gained the first left rib, which it traversed, making an aperture clearly marked but radiated by numerous fissures extending all the length of the bone, and so reached the thoracic cavity, where it perforated the anterior aorta as well as the anterior lobules of the pulmonary lobes, which were found floating in a considerable coagulum of blood; leaving this cavity it entered the second and third ribs on the right, dilacerating the mass of the great extensor muscles of the forearm to escape by an aperture with slightly turned-up edges; the diameter of this opening was a little greater than that of the one by which it entered. Pursuing its course in such a way as to strike the off horse through an aperture in all respects similar to the first, the bullet made its way behind the left shoulder and the great extensor muscles of the corresponding forearm, cleared the intercostal space between the sixth and seventh ribs, broke off the anterior edge of the latter, causing a comminuted fracture, the fine splinters of which were found submerged in the midst of the lacerated muscles, crossed the thoracic cavity, ploughing through the midst of the pulmonary lobes, created a broad hemorrhagic focus and smashed them into pulp, then tore off the base of the diaphragm on the right, and carbonised the duodenum for a length of six centimètres, after having reduced the right lobe of the liver to a deliquium, then finally escaped at a point on a level with the eleventh rib, which it fractured in an irregularly toothed, slanting direction, dragging after it numerous splinters, reaching finally the skin, which it perforated by means of an aperture with ecchymosed edges, hanging downwards externally.

Such injuries, made by a projectile of so small calibre, need no comment, and leave us sufficient food for conjecture as to how murderous would be their military action in a future war.—*Recueil Vétérinaire.*

THREE INTERESTING CASES OF PSEUDO-FARCINOUS LYMPHANGITIS.

The first is that of a horse belonging to a stable where glanders had been recently proved to exist; all the animals contaminated had undergone the mallein test, and those which had reacted had been rigorously isolated. The horse in question was included in the sound animals. In the course of the inspection to which the establishment was subjected, it was discovered that the animal showed, on a level with the right hind fetlock joint, a large swelling somewhat hot and sensitive, with several pimples on the internal face, which were rounded, projecting, and soon fluctuated. The animal was again malleined without his reacting any more than he did the first time; it then occurred to the veterinary surgeon to puncture the fluctuating pimples, to collect the pus from them and send it to me: microscopic examination, inoculation of a male guinea-pig, and the cultures gave me sufficient grounds for reassuring my *confrère* and informing him that it was a case of non-glanderous lymphangitis, identical with what I have described in my work on the subject.

The second case differs from the first in this way that ulcerous lymphangitis showed itself in an infected stable in a horse belonging to the class which

had reacted to the mallein. On the appearance of this clinical sign, which was quite naturally connected by him with farcy, the veterinary inspector requested that the subject should be slaughtered; on autopsy he discovered the existence of a good number of miliary tubercles in different stages of evolution; it occurred to him, too, to collect the pus in the farcinous pimples and send it to me; microscopic examination showed a great number of bacillary clusters similar in every way to those of ulcerous lymphangitis, but not a single glanderous bacillus; inoculation of a male guinea-pig and the cultures confirmed the indications of the microscopic examination and gave sufficient ground for affirming that this pus was of a non-glanderous nature. It was then in reality a case of simple ulcerous non-glanderous lymphangitis, developed in a horse affected with pulmonary glanders. This shows once again the folly of the old belief as to the virulence which spread over "the whole substance" of the diseased organism. As to glanders it is well known the virulence in the immense majority of cases does not exist outside the specific lesion, and the glandered animal can make pus without this pus being necessarily glanderous. This observation further shows how prudent one must be before formulating a decisive diagnosis in a like matter; we must always have recourse simultaneously to *all* the processes of diagnosis which can be employed. The clinical diagnosis seemed in this case firmly established, since the farcinous lesion attacked a suspected horse, whose pulmonary lesions had been made evident by the mallein; the microscope, inoculation and culture, however, proved that this diagnosis was erroneous: if recourse had been had to these before slaughtering of the animal, it might have been preserved, just as those which have reacted to mallein without showing any of the clinical symptoms of glanders.

The last case is still more interesting. It concerns an old horse, recently bought. Fifteen or twenty days after the purchase the animal was left with me for observation, because of an unilateral discharge and a gland which had shown themselves for several days. As is always the way in cases of the kind, some of the discharge was collected to inoculate some male guinea-pigs, and the horse was injected with mallein. There was not a trace of reaction; on the other hand, on the third day after inoculation the guinea-pigs showed no signs of orchitis. I then thought myself authorised in returning the animal to its owner, certifying that it was not glandered. The next morning, being obliged to go from home for twenty-four hours, and being in a hurry to catch the train, I asked the groom if anything new had turned up. He told me that one of the inoculated guinea-pigs had intense inflammatory orchitis. I was disagreeably surprised, and, I confess, that at first I did not think it could possibly be a case of a non-glanderous legion. I then sent to ask the owner to send me back his horse and give me a few more days. As soon as possible after I had come back I killed the suspected guinea-pig, and examined the purulent matter which covered the two leaves of the sheath and held them as if soldered to one another. To my great surprise, I found that the pus contained, in considerable quantities, bacilli of ulcerous lymphangitis and not a single glanderous bacillus; inoculation of an ass, which remained without effects, and cultures on different media confirmed these results. So, then, we see that the bacillus of ulcerous lymphangitis can provoke lesions simulating those of glanders as well as those of farcy. We may easily conceive besides that nothing is opposed to the fact that it developes in the lymphatic vessels of the respiratory mucus, as it so often does in those under the skin. In this case, where was the seat of the lesion? What were its extent, aspect, and gravity? These are questions to which I can give no answer, no autopsy having been made: but I shall follow the animal attentively, and, if I can make its autopsy, I will inform you in due course of its results.—M. Ed. Nocard, in a communication to the *Recueil Vétérinaire.*

Obituary.

THE LATE MR. FINLAY DUN.

THE death is announced of Mr. Finlay Dun, Gorgie House, Edinburgh, late secretary of the Swan Land and Cattle Company, Limited. A son of the late Mr. Finlay Dun, a well-known music master and composer, the deceased gentleman, who was born in the city in 1830, early took to the study of veterinary science, of which he eventually became a recognised authority. Graduating at the Royal (Dick) Veterinary College, Mr. Dun was afterwards lecturer on materia medica and dietetics at the same institution. From Edinburgh he proceeded to Warwickshire to take up the duties of factor on Sir George Phillips', Bart., Weston Park estate, on which he took a deep interest in the welfare of the farm servants and labourers under his charge, and paid considerable attention to the improvement of the farms. Having acted in this capacity for some twenty-two years, Mr. Dun went to London as an estate agent. While in the metropolis he received the appointment of commissioner to the *Times*, and from America he contributed to that journal a series of communications on "Food and Farming," which were afterwards reproduced in book form. During the winter of 1880 Mr. Dun visited Ireland, and inquired into the questions of land tenure, estate management, the social conditions of tenants and labourers. As the result of these inquiries Mr. Dun published a book entitled, "Landlords and Tenants in Ireland." As an author, however, his principal work was "Veterinary Medicines: their Actions and Uses," which went through eight editions. The first edition was published in 1854, and only a few months ago Mr. Dun was engaged on a ninth edition. This work formed the text-book at the British veterinary colleges, and was also used by veterinarians and agriculturists not only in this country, but in the United States of America and the Colonies. A Fellow of the Royal College of Veterinary Surgeons, Mr. Dun was for years an examiner for the diploma of the Highland and Agricultural Society and the Royal College of Veterinary Surgeons, as well as for the Fellowship of the last-named institution. Quite recently he was appointed an examiner for the B.Sc. degree in the Department of Agriculture at Edinburgh University. Fourteen years ago Mr. Dun, having returned to Edinburgh, was appointed secretary of the Swan Land and Cattle Company, a post which he filled with much acceptance till within a very short time of his death. Towards the end of February last, Mr. Dun, while at work in his office, 130, George Street, was struck down with apoplexy, from which he never recovered, and died on Tuesday. As a veterinary expert the deceased gentleman had a great reputation. Personally he was a genial, kind-hearted man, who was held in the highest esteem by a wide circle of friends. An Episcopalian, and a Liberal Unionist, Mr. Dun, who was in his sixty-eighth year, is survived by two sons and four daughters, all of whom are grown up. One of his sons is Dr. Craig Dun, Liverpool.

LEATHER, Thomas, Liverpool .. .. March, 1885.

On September 15th, the remains of Mr. Thomas Leather, who died at his residence, 32, Great Mersey Street, in the 44th year of his age, after a long illness, were interred at Anfield Park Cemetery. The deceased was a member of the firm of Joseph Leather & Sons, veterinary surgeons, of this city, and was well known and highly respected. The chief mourners were Messrs. Arthur Leather, F.R.C.V.S. (brother), Bertie Leather, (nephew), Wallace Smith (brother-in-law), John Hill (nephew), J. M'Laren, M.R.C.V.S. (partner), W. W. Smart, W. Truman, W. B. Reynolds, C. W. Sutton, E. Rigby, and C. Mowbray.—*Liverpool Mercury.*

Review.

PRINCIPLES AND PRACTICE OF VETERINARY MEDICINE By W. WILLIAMS, F.R.C.V.S., F.R.S.E., etc., Principal of the New Veterinary College, Edinburgh. Eighth edition. Revised by the author, assisted by his son, W. OWEN WILLIAMS, F.R.C.V.S., F.R.P.S., F.R.S.E. (London: Baillière, Tindall, & Cox; Edinburgh and Glasgow: John Menzies & Co.)

This monumental and masterly work of Principal Williams has been so highly appreciated by the veterinary profession and the general public, both in the old country and the New World, that an eighth edition has been called for, but not before the work had been pirated by an enterprising firm of publishers in New York. On account of the rapid advance made by bacteriological science the author has found it necessary to recast the bacteriological portion of his great work in order to bring it fully up to date. As a matter of course, a most interesting account of the investigation conducted by the author for the Highland Society in regard to Louping-Ill, and of the further investigation conducted by Principal Williams for the Government of Jamaica, is embodied in the volume. At this time of day it is unnecessary to say anything in commendation of Principal Williams' great work, for it is undoubtedly a great work. On every page it bears evidence of the intrepid and masterly intellect which has raised the author to a commanding and unique position among the veterinary scientists of the nineteenth century. The volume, it may be added, is most beautifully illustrated in coloured plates and woodcuts.—*North British Agriculturist*, 29th September, 1897.

Communications, Books, Journals, etc., Received.

The Lancet; Land and Water; Veterinarian; Veterinary Record; American Veterinary Review; Journal of Comparative Medicine; Australian Farm and Home; Results of Use of Tuberculin, by James Wilson, M.A.; Bacteriological Diagnosis, by St. John Reid; Country Life Illustrated; Recueil de Médecine Vétérinaire (Alfort); La Presse Vétérinaire (Paris); L'Echo Vétérinaire (Liége); Annales de Médecine Véterinaire (Brussels); Berliner Thierärztliche Wochenschrift (Berlin); La Clinica Veterinaria (Milan); Il Nuovo Ercolani (Pisa); La Revista Veterinaria (Buenos Aires); Deutsche Thierärztliche Wochenschrift (Hannover und Karlsruhe); Archivos de Medicina Lisbon: José Bastos).